

THE LARYNGOSCOPE.

VOL. XXIX.

ST. LOUIS, JUNE, 1919.

No. 6

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

AMYLOID TUMORS OF THE UPPER AIR PASSAGES.*

DR. GORDON B. NEW, Rochester, Minn.

Amyloid tumors of the upper air passages are rare. They occur as part of a general amyloidosis in which other organs of the body may be involved, or as a local condition. The upper air passages more frequently than any other part of the body are involved in a local amyloidosis. These tumors may be divided into three types: (1) Diffuse subepithelial infiltration; (2) tumor forming local amyloidosis; (3) amyloid degeneration of a pre-existing tumor.

Wichmann in his history of amyloid disease states that Portal was the first to call attention to the similarity to lard of the substance found in certain diseased livers, and carefully to note the etiologic findings. It was not, however, until Rokitsansky had published clear descriptions of the condition observed microscopically and had differentiated between amyloid and fatty livers, that amyloidosis was definitely recognized.

Burow and Neumann in 1873 were the first to recognize amyloid tumors in the larynx; these were found at necropsy. Seven years before Burow had removed fibroid tumors from the palate of this patient, who at that time refused operation for similar tumors in the larynx. The authors believe that amyloid degeneration had occurred in the fibroid tumors.

In 1875 Ziegler, at necropsy, found multiple amyloid tumors of the tongue and larynx and believed them to be of syphilitic origin (Fig. 1). Since then numerous articles and case reports on the subject have appeared in the foreign literature. Seckel, Reich, and

*Submitted by publication, May 27, 1919.

Pugnat have contributed recent articles of note. Hooper in 1891, and Eisenbrey in 1916 contributed the only two case reports in the English literature.

Incidence.—From a thorough review of the literature I have been able to collect but forty-two cases of amyloid tumors of the upper air passages; the four cases I have observed in the Mayo Clinic make forty-six cases in all.* The relative incidence of amyloid tumors

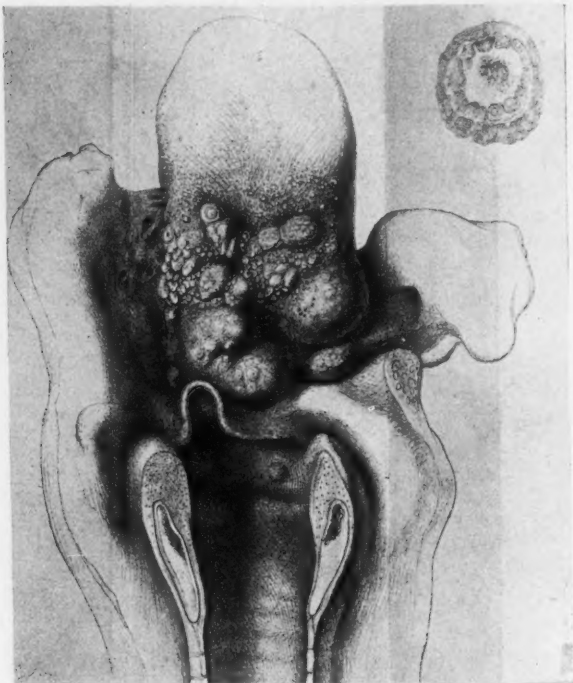


Fig. 1. Drawing (Ziegler's case). Note the multiple tumors of the tongue and pharynx.

of the larynx may be judged by the fact that only four cases have been found among 217 neoplasms of the larynx examined at the Mayo Clinic. Table 1, following Seckel's method of tabulating his twenty-six cases, shows the findings in the forty-two cases reported in the literature and in my own four cases.

Age.—The youngest patient with an amyloid tumor of the larynx was twenty years, the oldest eighty. About half the patients were

*An additional case has been reported by Gliński, L. K.: (Amyloid tumor in the larynx.) *Prsegl. lek. Krakone*, 1914, lili, 417-421. I have been unable to translate this from the Polish.

between fifty-one and seventy; ten patients were under forty years.

Patients between 20 and 30 years					2
"	"	30	"	40	8
"	"	41	"	50	5
"	"	51	"	60	11
"	"	61	"	70	11
"	"	71	"	80	4
Age not stated					5

46



Fig. 2 (170234). Diffuse amyloid tumor, Type 1, of the entire circumference of the larynx and upper part of the trachea.

Sex.—Thirty-two of the forty-six patients were males, ten were females. In four instances the sex was not stated. In the cases reported males were affected three times as often as females; in my own cases all were females.

Symptoms and duration of symptoms.—The symptoms of the amyloid tumors of the upper respiratory tract vary with the location of the tumor. In many of the cases reported there were no local symptoms, but the condition was accidentally found at necropsy. When the larynx and the trachea are involved the symptoms are such as accompany benign neoplasms of slow growth. In the cases reported by Gross and by Willimann, however, they were of short duration, five and six weeks respectively.

In the diffuse infiltrating type of tumor in which the larynx and trachea are affected, as in Case 1 and Case 2 of my group, early hoarseness and later (Case 1) dyspnea were noted. One patient (Case 4) came to the clinic for an abdominal complaint, but as at times she was slightly hoarse in the evening, she asked to have her throat examined. In Reich's case the patient had noted difficulty in breathing for fifteen years, but had been able to work. Burow's patient, and my first patient, required a tracheotomy for the laryngeal obstruction. Characteristic symptomatology of these tumors cannot be gathered from the case reports in the literature.

The exact duration of amyloidosis of the upper air passages is difficult to determine from the history of a case, as undoubtedly

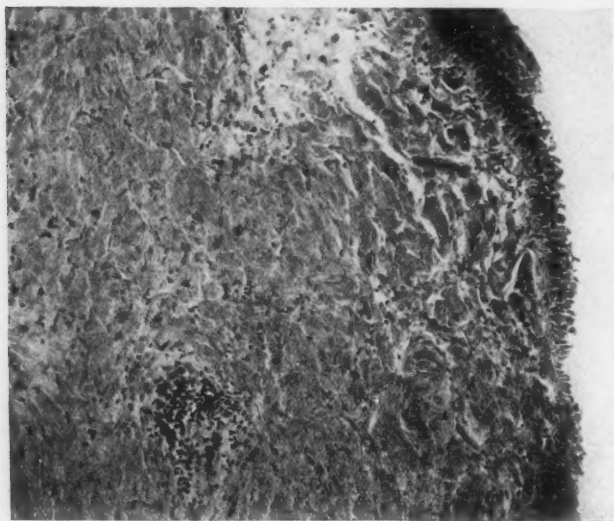


Fig. 3. (170234). Photomicrograph. Subepithelial amyloid degeneration. Hematoxylin and eosin stain. X100.

many patients have no symptoms for years. Some of the cases found at necropsy were not suspected during life. Balser's patient gave a history of nineteen years' duration, the longest history of any case reported. Reich's patient had symptoms for fifteen years.

Location of tumors.—Amyloid tumors of the upper air passages are most common in the larynx. They are found in the larynx three times as often as in the trachea, which comes next in the order of frequency. The larynx or the trachea was involved in thirty-eight of the forty-six cases, the larynx alone in twenty-seven, the

trachea alone in five, the trachea and larynx in six, the tonsil in one, associated with the condition in the tongue, and the pharynx in one, associated with the condition in the larynx. In one patient (Glockner's) three organs were affected, the larynx, the trachea, and the bronchi.

ORGANS INVOLVED.

Tongue	9	Larynx	33
Tonsil	1	Trachea	11
Pharynx	1	Bronchi	2

Clinical findings.—The clinical findings of amyloid tumors of the upper respiratory tract are by no means uniform. While many of the cases present a picture that is seen in amyloid tumors only, others present one that is impossible to differentiate clinically from

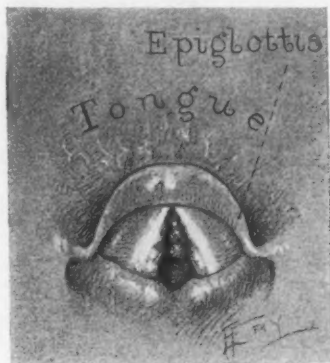


Fig. 4. (211230). Uniform involvement of both vocal cords and subglottic region with the diffuse subepithelial type of amyloid degeneration.

other benign neoplasms, from gumma, or from malignant growth, as in Willimann's case.

The diffuse subepithelial infiltration (Type 1) was seen in Case 1 and Case 2 of my group; the mesial margins of the true cords and the entire circumference of the subglottic region and upper part of the trachea were rather uniformly thickened, causing a narrowing of the glottis and trachea. Balser's case also seems to be of this type, which is by far the less common type seen in the upper air passages.

Local amyloidosis of the upper air passages occurs most often in nodular form. Multiple or single nodules which may be pedunculated or sessile develop in the tumor, forming local amyloidosis (Type 2). Eleven cases in the literature were of the multiple type. The tumors occur in different sizes and shapes, but all tend toward

the rounded or oval form. Case 4 of my group is interesting on account of the bilateral symmetrical tumors of the anterior part of the false cords.

Amyloid degeneration may develop in a pre-existing tumor (Type 3) such as a fibroid, as in Burow's and Neumann's case, or in an angioma, as in Martuscelli's and Porfidia's case. Seckel suggests a classification of such tumors similar to that of our Types 1, 2, and 3. In his case the tumors were found in varying sizes on the larynx and pharynx.

The surface of amyloid tumors is usually mammillated; the tumors are quite firm when touched with a probe; the mucous membranes are not ulcerated, and in most cases they are a waxy yel-



Fig. 5. (234587). Bilateral symmetrical amyloid tumors of the anterior part of the false cords.

lowish grey, although Pinaroli, Martuscelli, Massei, and Pacinotti report that the mucous membrane in their cases was red.

Willimann's case presented uniform swelling of the diseased side of the larynx, much the same as seen in gumma or carcinoma; the possibility of these conditions had to be excluded in making the diagnosis. In two cases the local amyloid tumor of the larynx was associated with carcinoma (Courvoisier, and Buch and Scholz), but Buch and Scholz believe that the two tumors in their case were entirely distinct.

Diagnosis.—Although the clinical picture is fairly typical of amyloid tumor, the diagnosis must be made microscopically. This is well illustrated by a recent case of mine which showed a clinical picture very similar to that of Case 1 and Case 2. The patient

gave a history of twelve years' gradual loss of voice and increasing dyspnea. There was no ulceration in the larynx. The condition was diagnosed clinically as a diffuse amyloid tumor of the larynx and trachea, but microscopically it proved to be epithelioma (mixed tumor type). In some cases, however, as in my Case 2, it is quite possible to make a clinical diagnosis which the pathologist corroborates.

Associated general pathology.—It is an accepted fact that general amyloidosis occurs following certain chronic diseases, such as osteomyelitis, tuberculosis, and syphilis. In these cases the abdominal organs are usually extensively involved. The cases collected are of local amyloidosis without general degenerative processes, but the condition may be due to chronic inflammation elsewhere in the body. In many of the cases in the literature a local tumor without mention of any associated general pathologic condition is reported; when the data are complete many cases show a general pathologic condition, which may be sufficient to account for the local degenerative process.

Seckel's, Hueter's, Kraus's, and Pacinotti's patients had tuberculosis. Only two patients were suspected of having syphilis, those of Ziegler and of Schrank. Two patients (Balser's and Saltykow's) had a bronchiectasis. Chronic emphysema was associated with three cases of amyloid tumor of the tongue, and with three of the larynx and trachea. Nephritis was found in both of Saltykow's cases. In only one of my four cases was there an associated pathologic condition, a chronic cholecystitis, for which operation was done.

Pathology.—Many of the writers who have reported amyloid tumors of the air passages believe that they should not be called tumors, as they are simply enlargements of the part, due to the deposit of the amyloid substance, without accompanying cellular growth. From a strictly pathologic standpoint this view is correct. The microscopic pathology of this condition depends on the type of tumor present. In the diffuse, and in the tumor forming type of local amyloidosis a sub-epithelial infiltration of the amyloid substance is noted. The blood vessels are especially affected. The mucosa and submucosa are elevated by the amyloid deposit which is seen in layers closely packed between connective tissue. In the cases of amyloid degeneration of a tumor, as, for example, of a fibroid or of an angioma, the characteristics of the original growth, as well as of the amyloid degeneration, may be found. The amyloid gives the characteristic staining reaction with iodine, and shows up distinctly with hematoxylin and eosin.

Treatment.—In many of the cases recorded in the literature the tumor appeared as a small nodule on the vocal cord and was readily removed perorally. In cases of localized tumors surgical removal, either by the endoscope or by thyrotomy, seems indicated. Uffenorde and Pognat removed the tumor from their patients by endoscopic methods. Reich reports the successful removal of an amyloid tumor of the trachea by external operation.

If the amyloidosis is diffuse and involves the entire circumference of the larynx and trachea the removal will probably result in the loss of voice and necessitate the permanent use of a tracheotomy tube because of secondary contractions. The procedure seems justified, however, if the disease is extending down the trachea, as in my Case 1.

Willimann reports a case in which an amyloid tumor of the larynx entirely disappeared after two x-ray treatments. The treatments were six weeks apart, the first time one "Sabouraud," and the second time one-half Sabouraud strong.

I have employed fulguration and radium with marked improvement in my cases, except in Case 1, in which a thyrotomy was done and the diffuse amyloid infiltration that involved the circumference of the larynx and trachea was removed. This was followed by radium.

REPORT OF CASES.

Case 1 (170234). Mrs. C. R., aged fifty-six years, was examined in the clinic August 22, 1916. The patient had been hoarse for one year following an attack of the gripe and a severe cough, which she believed to be the onset of her trouble. Dyspnea, which was gradually increasing, was noted seven months before examination. A physician, who had been consulted four months before, discovered a laryngeal growth. The patient had no trouble in swallowing, no cough, no expectoration, nor pain. She had lost twenty-five pounds in weight. The general examination was negative except for laryngeal findings. The Wassermann test, urine, and sputum, and x-ray of the chest were negative. There was thickening of the entire circumference of the larynx at the level of the true cords, involving their mesial margins and extending down into the trachea (Fig. 2). A small finger-like process extended into the glottis from the anterior commissure. The mucous membrane was yellowish gray, the tissue was waxy. The cords were partially fixed. The patient could speak only in a whisper. Subepithelial amyloid degeneration was found in the tissue removed from the larynx for diagnosis (Fig. 3). Because the entire circumference of the larynx

and trachea were involved, it was decided that a radical operation would cause tracheal and laryngeal stenosis. The patient was, therefore, treated with radium, the radical operation to be done later if necessary.

The first radium treatment was given December 1, 1916; 100 mg. radium were dropped into the larynx and trachea after cocaineization; eleven hours of treatment were given at different sittings. The patient went home and did not return to the clinic until January 8, 1918. She stated that in September, 1917, it had been necessary to have a tracheotomy done for marked dyspnea. Radium was given outside the larynx. As the trouble was extending down into the trachea it was thought advisable to do an exploratory operation.

March 19, 1918, thyrotomy was performed (E. S. Judd). The hyoid bone was divided and the upper part of the trachea exposed. The mucous membrane of the upper part of the trachea and of the subglottic region involving the mesial margins of the cords were thickened and presented an irregular mammillated appearance. This thickened mucous membrane was removed by means of scissors; the wound was cauterized. Stenosis of the trachea and larynx developed during convalescence and despite attempts to keep these open the patient was obliged to continue wearing a tracheotomy tube. Radium treatment has been given from time to time; there has been no recurrence.

Case 2 (211230). Mrs. C. C. T., aged forty-four years, gave a history of loss of voice for three and one-fourth years. At the onset of the trouble the patient had a severe cold, which lasted three weeks, with hoarseness. The hoarseness continued to grow worse and for the last two years she had been able to speak only in a whisper. She had no cough, no expectoration, nor dyspnea. She had gained twenty-five pounds in the last two years. The nose and throat examination was negative except for the laryngeal findings. The portion of the larynx above the true cord was normal. The mesial margins of the true cords and the entire circumference of the larynx at this level and in the subglottic region showed rather irregular and mammillated thickening that was of a yellowish gray, waxy color (Fig. 4). There was no ulceration. The general examination was negative except for fibroids of the uterus. The Wassermann test, x-ray of the chest, the sputum, and the blood count were negative.

Tissue removed for diagnosis showed subepithelial amyloid infiltration. Radium treatments were begun April 20, 1918; a 100 mg. tube for forty hours over the larynx, with one inch elevation, and

2 mm. of lead screening was used. A second treatment was begun November 22, 1918; a 100 mg. tube for fifty hours was used. There was a marked improvement in the laryngeal condition and in the character of the voice. The patient can now make herself heard at some distance.

Case 3 (222018). Mrs. J. D., aged thirty-six years, came to the clinic February 23, 1918, for hoarseness noticed seven years before. A physician had been consulted at that time, and the x-ray and medicine internally had been used. The patient's voice never became normal, she did not cough nor expectorate, but was slightly dyspneic on exertion. There was no loss of weight. The general examination was negative. The nose and throat examination was negative except for laryngeal findings. A sessile tumor, nodular and yellowish waxy, involved the left side of the larynx and the anterior commissure, and bulged to the midline of the glottis. There was no area of ulceration. The left cord could not be seen, but the right cord motion was not impaired. The tissue removed for diagnosis showed it to be an amyloid tumor. As the patient did not wish to have a radical operation done, as much as possible of the tumor was removed by indirect method, and the base was fulgurated. This procedure was repeated July 15, 1918. The patient was advised to have a thyrotomy with removal of the tumor, but she has not as yet returned to have this done.

Case 4 (234587). Mrs. M. W. W., aged fifty-two years, came to the clinic June 13, 1918, on account of abdominal trouble. Because of hoarseness occasionally evenings during the past five months the patient asked to have her throat examined. She was not dyspneic. The examination of the nose and throat was negative except for the laryngeal findings. The voice was slightly husky. There was a bilateral tumor of the anterior half of each false cord that was continuous with the rest of the cord (Fig. 5). The tumors almost approximated in the midline and obstructed the view of the true cords anteriorly. The mucous membrane was normal in color, but somewhat mammillated. The cords approximated normally posteriorly. The general examination showed nothing of note. The Wassermann test, x-ray of the chest, the blood count, and the sputum were negative. Amyloid infiltration was found in the tissue removed from both tumors. On account of their location it was thought best to fulgurate perorally. This was done four times by the indirect method, the first time June 26, 1918, and the last time April 30, 1919. The tumors have been much reduced in size and the patient's voice is almost normal.

Table I.

No.	Author	Publication	Sex	Age	Duration of symptoms	Location					Diagnosis				Associated general pathology	Remarks
						Tongue	Pharynx	Larynx	Trachea	Bronchi	Number of tumors	Clinical	Autopsy	Biopsy	Operation	
1	Burrow and Neumann	Arch. f. Klin. Chir. 1875.	M	50	10 yrs.			+			3	+				Three tumors diagnosed as fibrinoid removed and tracheotomy done 7 yrs. before death.
2	Ziegler	Virchow's Arch., 1875	M	67		+									+	Fatty degeneration of the heart
3	Baizer	Virchow's Arch., 1883	M	64	13 yrs			+		+			+			Emphysema, pneumonia bronchiectasis.
4	Massei I	Arch. Ital. di laring. 1894-5	M	20				+			Multiple	+				
5	Massei II	Arch. Ital. di laring. 1894-5	M	50				+			Multiple	+				
6	Kraus I	Ztschr. f. Halsk., 1885	M	36		+					1	+				Tuberculosis
7	Kraus II	Ztschr. f. Halsk., 1888	M	?						+	1	+				Emphysema, pneumonia
8	Hooper	Med. Rec., 1891	M	53	4 yrs.			+						+		
9	Schrank	Insug.-Blat., 1892	F	35				+			1			+		Syphilis (?)
10	Schmidt I	Virchow's Arch., 1896	M	58		+					2	+				Bronchitis, emphysema
11	Schmidt II	Virchow's Arch., 1896	F	60		+					1	+				Emphysema
12	Martuscelli I	Arch. Ital. di laring. 1896						+			1		+			
13	Martuscelli II	Arch. Ital. di laring. 1896						+			2		+			
14	Martuscelli III	Arch. Ital. di laring. 1897	M	20	Mon.			+			1	+				
15	Schretter	Verh. d. deutsch. path. Gesell., 1899	F	57						+				+		
16	Manasse	Virchow's Arch., 1900	M	63				+			Multiple	+				Perforating duodenal ulcer

Table I (Cont'd).

[illegible]

REFERENCES.

1. BUROW, W. Tracheo- und Bronchostenose mit Amyloid in der Wandung der Luftwege. *Virchow's Arch. f. path. Anat.*, 1883, xci, 67-76.
2. BECK, K., and SCHOLZ, W. Carcinom und Amyloid des Larynx. *Arch. f. Laryngol.*, 1909, xxi, 396-405.
3. BUROW and NEUMANN. Amyloide Degeneration von Larynxtumoren. Canüle sieben Jahre lang getragen. *Arch. f. klin. Chir.*, 1875, xviii, 242-246.
4. CHIARI. Ueber multiple Amyloidtumoren des Larynx und Pharynx. *Deutsch. med. Wchnschr.*, 1912, xxxviii, 488. Also: *Berl. klin. Wchnschr.*, 1912, xlix, 188.
5. COURVOISIER, W. Ueber Stenose bei Amyloiddegeneration im Kehlkopf. *Munchen. med. Wchnschr.*, 1902, xlix, 1250-1251.
6. EDENS, E. Zur Histopathologie lokaler und allgemeiner Amyloiddegeneration. Zugleich ein kasuistischer Beitrag. *Beitr. z. path. Anat. u. z. allg. Path.*, 1904, xxxv, 233-251.
7. EISENBREY, A. B. An amyloid tumor of the larynx. *Proc. New York Path. Soc.*, 1916, n. s., xvi, 42.
8. GLINSKI, L. K. [Amyloid tumor in the larynx.] *Przegl. lek.*, Krakow, 1914, lili, 417-421.
9. GLOCKNER, A. Ueber lokales tumorförmiges Amyloid des Larynx, der Trachea und der grossen Bronchien mit dadurch bedingten Laryngo-Tracheostenose. *Virchow's Arch. f. path. Anat.*, 1900, vix, 583-602.
10. GROSS, H. Ueber Amyloidtumoren der Zunge. *Deutsch. Ztschr. f. Chir.*, 1906, lxxxiv, 462-468.
11. HELLER, J. Zur Kenntnis der Amyloidtumoren der Zunge. *Wien. klin. Wchnschr.*, 1908, xxi, 1383-1386.
12. HENKE. *Verhandl. d. deutsch. Gesellsch. f. Path.*, 1907, x. Quoted by Seckel.
13. HERXHEIMER, G. Ueber multiple Amyloidtumoren des Kehlkopfs und der Lunge. *Virchow's Arch. f. path. Anat.*, 1903, clxxiv, 130-162.
14. HOOPER, F. H. A case of tumor of the larynx showing amyloid degeneration. *Med. Rec.*, 1891, xxxix, 285.
15. HUETER, C. Entzündliche Amyloidbildung im Kehlkopf. *Path. Anat. Arb. . . Joh. Orth z. . . Prof.-Jubil.*, Berl., 1903, 119-129.
16. JOHANNI, J. U. Ueber einen Amyloidtumor des Kehlkopfs und der Trachea. *Arch. f. Laryngol.*, 1903, xiv, 331-349.
17. KAUFMANN, E. Stenosierender Amyloidtumor des Larynx. *Cor. Bl. f. schweiz. Aertz.*, 1902, xxxii, 758.
18. KRAUS. *Ztschr. f. Heilk.*, 1885; 1886. Quoted by Seckel.
19. LENART, Z. Ein operierter Fall eines Amyloid-Tumors des Kehlkopfs und der Trachea. *Pest. med.-chir. Presse*, Budapest, 1908, xlv, 1048. Also: *Orvosi hetilap*, 1908. Quoted by Uffenorde.
20. LINDT. [Discussion], *Verh. d. Ver. süddeutsch. Laryngol.*, 1904. Quoted by Seckel.
21. LUKSCH. Ein Präparat von Amyloidose der Trachea. *Wien. klin. Wchnschr.*, 1911, xxiv, 518.
22. MAGER, W. Ueber Amyloidtumoren im Larynx. *Wien. med. Presse*, 1901, xlii, 1257-1265.

23. MANASSE, P. Ueber multiple Amyloid-Geschwülste der oberen Luftwege. *Virchow's Arch. f. path. Anat.*, 1900, clix, 117-136.
24. MARTUSCELLI, G. Tumori amiloidi della laringe. *Arch. ital. di laringol.*, 1896, xvi, 97-107.
25. MARTUSCELLI, G. Di un altro tumore della laringe. *Arch. ital. di laringol.*, 1897, xvii, 23-24.
26. MARTUSCELLI, G. and PROFIDIA, G. Tumore gigante della laringe (angioma in fase ialino-amiloidea). *Gior. internaz. d. sc. med., Napoli*, 1914, n. s., xxxvi, 210-215.
27. MASSEI. Sul neoplasmi laringei; studii e casuistica. *Arch. ital. di laringol.*, 1884-5, iv, 77.
28. PACINOTTI, G. Su di un tumore così detto amiloide della laringe. *Boll. d. mal. d. orecchio, d. gola e d. naso*, Firenze, 1902, xx, 49-66.
29. PINABOLI, G. Sul processi di degenerazione ialina e amiloide nei neoplasmi della laringe. *Arch. ital. di otol., Torino*, 1910, xxi, 366-373.
30. PORTAL. Quoted by Wichmann.
31. PUGNAT, A. Etude sur les tumeurs amyloides du larynx. *Rev. de laryngol., d'otol., et de rhinol.*, 1918, xxxix, 202-210.
32. REICH, A. Ueber die Amyloidtumoren der Trachea. *Beitr. z. klin. Chir.*, 1909, lxxv, 577-598.
33. ROKITSANSKY. Quoted by Wichmann.
34. SALTYSKOW, S. Ueber die sogenannten Amyloidtumoren der Luftwege und des Anfangsteils des Verdauungskanal. *Arch. f. Laryngol.*, 1903, xiv, 321-330.
35. SCHMIDT, M. B. Ueber die localen Amyloidtumoren der Zunge. *Virchow's Arch. f. path. Anat.*, 1896, cxliii, 369-399.
36. SCHRANK, W. Ueber amyloide Tumorbildung im Kehlkopf. Göttingen, 1892.
37. SCHROTTER, H. v. Laryngologische Mittheilungen. *Verhandl. d. deutsch. path. Gesellsch.*, 1899, Berl., 1900, 459. Also: *Monatsschr. f. Ohrenheilk.*, 1898, xxxii, 463.
38. SECKEL, P. Multiple Amyloidtumoren des Larynx und Pharynx. *Arch. f. Laryngol.*, 1912, xxvi, 1-16.
39. SEIFERT. *Verh. d. Ver. süddeutsch Laryngol.*, 1904. Quoted by Seckel.
40. UFFENORDE, W. Ein Fall von gutartigem Larynxtumor mit Amyloidartartung. *Monatsschr. f. Ohrenheilk.*, 1911, xlv, 1361-1365.
41. WERDT, F. v. Lokales Amyloid im gesamten Respirationstrakt. *Beitr. z. path. Anat., u. z. allg. Path.*, 1908, xliii, 239-261.
42. WICHMANN, G. Die Amyloiderkrankung. *Beitr. z. path. Anat., u. z. allg. Path.*, 1893, xlii, 487-628.
43. WILLIMANN, H. Ein weiterer Fall von Amyloidtumor des Larynx. *Arch. f. Laryngol.*, 1912, xxvi, 395-398.
44. ZIEGLER, E. Amyloide Tumorbildung in der Zunge und dem Kehlkopf. Ein Beitrag zur Lehre von der Amyloiden Degeneration. *Virchow's Arch. f. path. Anat.*, 1875, lxxv, 273-283.

SURGERY OF THE TRIFACIAL NERVE.

DR. JOHN F. BARNHILL, Indianapolis, Ind.

Surgical relief from trifacial neuralgia, or tic, usually is not sought until medicinal and other means of cure have long been tried and found but temporary or useless. Often the patient then is worn and wasted from the long suffering; the physical state is shattered, and not infrequently he is an addict to morphine. Frequently, but by no means always, the sufferer is past middle life, and not infrequently old. These patients are therefore usually not the best surgical risks.

Many reasons are assigned by the patient for delay in seeking surgical relief. In those of esthetic taste objection is raised to possible scars resulting from the necessary facial operations in nerve resection. Since it is a fact that the gratitude of the patient for surgical relief is often modified in proportion to the amount of scar or facial deformity, one essential is to choose a plan of operating, and to adopt a technic that will insure the minimum of deformity.

Fortunately surgical technic is at present so perfected that scars and deformities from facial operations frequently may be reduced to great insignificance. In the sense that these cases are free from the presence of pus they are clean, and therefore if a perfectly sterile technic be carried out inflammation and suppuration do not follow. It would seem unnecessary to state that the several operations for the relief of trifacial neuralgia should be done only in a hospital where the strictest asepsis is carried out, were it not that such operations are yet sometimes indifferently performed.

Many of these patients come with foul skins, due to prolonged application of numerous and often strange remedies; also to the fact that the pain resulting from the use of soap and water is so intolerable that no cleansing of the affected area has been done perhaps for months. Men often have foul, unkempt beards for the same reason. Unusual care is necessary in the sterilization of the field of operation in such cases.

The exact nature and extent of surgical procedures for the cure of facial neuralgia should be governed by the nature and extent of the disease. The seat of the affection may be in the brain, in the Gasserian ganglion, in any one of the three trunks, or, apparently, it may be solely in any one branch of one of the trunks. The diffi-

culty or even impossibility of accurately determining the actual seat of the disease makes it impossible in many cases to determine the essential point and necessary extent of surgical attack. Failure to accurately diagnose the seat of the lesion, no doubt, also accounts for failure to cure by surgical methods. Few clear data are at hand to enable the surgeon with certainty to say that the disease in one instance is in the Gasserian ganglion, while in another it is solely in the superior maxillary or other division. Clinical experience has been helpful in determining. The longer the duration and the greater the violence of the paroxysms of pain the more apt is the affection to approach or be located in the ganglion. When the nerve trunks have been excised previously without permanent relief it would seem proof positive that the disease is solely in the ganglion, were it always certain that the trunks and their branches actually had been removed. It is undoubtedly a fact that a portion of a nerve trunk may remain intact, and its branches continue actively neuralgic after apparently extensive operations by an able surgeon who failed to resect to sufficient depth. It would, therefore, not be entirely proper to conclude that because a given case had been operated one or more times, as evidenced by numerous scars and more or less facial palsy, that the nerve trunks had been adequately removed, and that the seat of the disease must, therefore, be entirely in the ganglion.

EXTRA-CRANIAL OPERATIONS.

Operations on the several branches of the trifacial nerve varying in extent from most trivial to major procedures have been long practiced. The procedures may be classed as extra-cranial and intra-cranial, depending of course upon whether the disease is attacked from without, or from within the skull. Extra-cranial procedures vary from attacks that are trivial and useless to operations that follow the nerve trunks to their exit from the skull, and therefore, judged by their magnitude and difficulty of performance, are of major significance.

An intimate knowledge of the origin, course and distribution of the trifacial nerve is entirely essential to successful surgery directed toward the cure of facial neuralgia. The branches of adjacent trunks of the trifacial apparently overlap and anastomose with each other in certain of their terminals, much to the confusion of the surgeon in determining which trunk is primarily affected, and which, therefore, should be subjected to excision. Thus certain of the terminal branches of the infraorbital, nasal and infratrochlear nerves terminate in and about the ala of the nose, the adjacent face and

upper lip with such intimacy that it often is extremely difficult to determine whether or not the neuralgic pain in this region is due to involvement of the ophthalmic, or to the superior maxillary branch. It is not strange, therefore, that instances are recorded in which the pain continued unabated after the removal of the infra-orbital, when in reality the diseased nerve was the nasal which was left untouched by the operation, or vice versa. A case in point is one which I recently operated in which resection of the infraorbital nerve had been performed when it was proven later by the operation that the infratrochlear and nasal nerves were the offenders.

Before any surgery of the nerves, nerve trunks or ganglion is undertaken it is presumed in this article that all pathologic conditions present that may be regarded as causative factors of the neuritis or *tic douloureux* have previously been removed. It must therefore be presupposed that any diseased teeth have been repaired or extracted; that all the nasal sinuses have been investigated by every method known to the rhinologist, corrected surgically, and that any other causes of neuritis have been surgically dealt with.

Of the three trifacial branches I favor surgery of the ophthalmic and its divisions at a much earlier period of the neuralgia than on the remaining divisions. The reasons for earlier surgical attack are: 1st, the greater probability of failure to relieve or cure by injection methods; 2nd, almost no scar or deformity should result; and, 3rd, the comparative ease with which the several branches may be dealt with surgically, provided the anatomical relations are mastered, and thoroughness in the execution of a well considered plan is carried out. It is true that if the disease is limited to the supra-orbital branch only, injection may be made successfully at the supra-orbital notch and operative measures thus temporarily avoided, but it is a fact, I believe, that the trochlear and nasal branches are more often involved, and that neuralgia of these can be relieved only by surgical methods.

If all branches of the ophthalmic nerve are involved the incision should follow the supra-orbital margin from the junction of the outer and middle thirds well down upon the bridge of the nose. The bleeding vessels are clamped and the orbital structures are loosened and held downward by means of a flat retractor. The supra-orbital and supra-trochlear branches of the nerve are readily isolated for a distance into the orbit; the deepest portion of the respective nerves are then caught in artery forceps and are twisted out by the Thiersch method.

In my own earlier recurring cases, as well as in the uncured cases of others following operation, I have sometimes noted the continuance of a nagging and at times unbearable neuralgia of the ala of the nose and the adjacent upper lip, which indicated that the nasal nerve had not been extracted. I know of no description of any method for the easy, successful avulsion of the nasal nerve. I have therefore devised the following plan, which is both simple and effective: In the incision above described, cut through the periosteum from the root of the nose to the lower end of the nasal bone and cautiously detach the periosteum toward the apex of the orbit until the anterior ethmoidal foramen is reached. The nasal nerve will readily be found entering this foramen. With a wide retractor the orbital contents are dislocated outwardly and downwardly putting the nerve on the stretch and exposing its trunk sufficiently to enable one to grasp it with an artery clamp. The periosteum at the point of penetration of the nerve is incised, the nerve loosened, and the whole is then easily twisted out deeply enough within the orbit to include the infratrochlear branch. All divisions of the ophthalmic may, therefore, be successfully extracted.

THE SUPERIOR MAXILLARY NERVE.

Operations for the resection of the infraorbital branch at its exit from the infraorbital canal have been described, and have often been performed. When the neuralgia is recent, and the disease is limited to the terminal branches of this nerve, neurectomy at the foramen with twisting the nerve from the foramen as far as possible, may have some use. It is not always easy to determine that the disease lies solely in the terminal branches, even when the pain is limited to the face, lip and nose, for the reason that the infratrochlear and nasal nerves are intimately associated with the infraorbital in supplying sensation to the same areas. I have seen cases improved but little or not at all from neurectomy at the infraorbital foramen when later extraction of the infratrochlear and nasal nerves gave complete relief.

If the upper teeth, roof of the mouth and soft palate are, in addition, involved, neurectomy at the infraorbital foramen has no surgical value. Twisting the nerve away external to the foramen by the Thiersch method is not helpful. I have again and again demonstrated on the cadaver that the nerve cannot thus be removed deeply enough to include even the anterior dental branch. Favorable results can be expected only when enough of the trunk has been extracted to include the anterior and posterior dental branches, and the branches to the sphenopalatine ganglion. This means, of course,

that, to be curative of the neuralgia, the trunk must be severed at, near, or in the round foramen.

The operations devised by Carnochan, Luecke-Lessen-Braun, and by Kocher are designed to extract the nerve down to the foramen rotundum by routes which differ from each other somewhat, but which involve the temporary removal of part of the malar and Zygoma, and of opening the antrum of Highmore. These operations were all devised by general surgeons, who presumably were not skilled in the use of reflected light and therefore possibly not as dextrous in deep cavity work as should be the rhinologist. Believing that a method should be followed which is both less in extent and less deforming than those of the eminent surgeons mentioned, and yet equally efficacious, I some years ago devised a plan which I called the "Trans-Orbital Route," and which I have performed many times with gratifying results. I first did the operation in 1906 and believed that I had devised something new. Later, however, I learned that Dr. A. Cook, of Hartford, Conn., had performed a somewhat similar operation in 1903, and that his preceptor, Dr. M. Storrs, had for several years previously employed a similar route in the extraction of the infraorbital nerve. I am so much impressed with the superiority of the trans-orbital route over other methods that I shall describe the plan in some detail. The Kocher incision for the exposure of the infraorbital foramen is used, only it is not extended quite so far upon the malar bone externally. The soft structures are retracted upwardly to the sharp edge of the orbit and the periosteum is incised along the entire length of the sharp infra-orbital margin. The periosteum of the entire orbital floor is lifted by a blunt periosteatome, when the orbital contents are then retracted upwardly upon a long handled, broad bladed spatula. Gauze packing is placed between the periosteum and orbital floor to arrest the oozing of blood from the several bone puncta. While waiting for the bleeding to cease the infraorbital nerve is loosened external to the foramen, a stout silk thread is tied about it at the exit, which thread is to be held by an assistant until the nerve trunk is finally extracted. The nerve, with the thread attached, furnished a most valuable guide throughout all subsequent steps of securing it to a sufficient depth. The terminal branches are cut upon the face, and the roof of the infraorbital canal is chipped away by means of a V-shaped chisel throughout its entire length, thus permitting the nerve to be lifted free from the canal back into sphenomaxillary fissure. Since the nerve often follows a curved course from the foramen rotundum to the infraorbital foramen, the convexity looking

outwardly, it is frequently necessary in order to secure the nerve trunk deeply, to chisel away the sharp lip of the inner or maxillary boundary of the fissure. The nerve is more firmly attached at the infraorbital foramen, and along the margins of the spheno-maxillary fissure than in the infraorbital canal, and hence the necessity of free dissection at the adherent points, after which the nerve may easily be lifted out of the canal once the osseous roof has been removed. A darkened room, a good reflected light and trained assistance are all essential. With the nerve held taut as a guide and with the apex of the orbit lighted from the head mirror, it may be followed through the fissure, grasped deeply by an artery forceps and twisted away to the foramen retundum. Examination of the nerve trunk thus removed in most of my cases, has shown the fragments of the several branches of the nerve, thus demonstrating their successful extraction. In several patients who previously had been operated by the Kocher or other method, but who were uncured, it was my extreme good fortune to find the stump of the nerve trunk by the trans-orbital route, to remove it deeply, and to demonstrate the removal of the remaining neuralgic branches.

The trans-orbital operation has the very great advantage of not opening the maxillary antrum, an event which is almost certain to be followed by troublesome infection of the antrum. Usually the roof of the infraorbital canal can be chiseled away and the nerve completely exposed without disturbing the osseous floor. Occasionally the floor of the canal is lost, but this without injury to the mucous lining of the antrum. With the exercise of reasonable care this operation can be performed without risk of infection, and, therefore, with but slight after pain, little scar or deformity, but with reasonably certain relief from the neuralgia.

The Inframaxillary Division: I have seen fewer cases of neuralgia of this nerve than of the others. In the earlier history of the pain it is easier to differentiate any affected branch and consequently at this time satisfactory relief is more likely to follow the extraction of the nerve superficially. Later when the neuralgia is widely distributed superficial attack has no value and methods contemplating the removal of the trunk down to the foramen ovale, or the removal of the ganglion itself must be considered. Most methods for deep removal of the trunk result in moderate scar and varying degrees of facial palsy. When the inferior dental branch is solely involved the nerve is best extracted per orum through an incision over the infra-dental foramen. This is not easy of performance, but laryngologists

with surgical training and surgical instinct should be able best to do it. Of course no scar and no deformity results from this plan. External methods are necessary if the foramen ovale is to be reached. Because of the certainty of more or less facial palsy, operations that require incisions to the bone over the external surface of the mandible should not be considered, except in extreme cases. Incisions which follow the lower and posterior margin of the jaw result in less deformity and are preferable, provided all the tissues down to the bone can be sufficiently retracted to expose the mandibular notch. This is entirely possible in lean patients, but in the robust the operations of Kocher or Kroenlein are necessary. Avulsion of a sufficient length of the nerve from the infradental canal is not possible except the canal be first opened by chiseling, and then loosening the trunk throughout its length between the infradental and mental foramen. I have made many experiments at avulsion of nerves from their canals, on the cadaver, especially of the infraorbital and infradental nerves, without first having opened the canal and loosening the nerve at the foramen, and have found that the nerve almost invariably snaps at its entrance into the foramen, or a short way in the canal, owing to the large amount of connective tissue which binds it at the entrance to or just within the canal. Hence in all operations on nerves which traverse osseous canals it is entirely essential to uncover and loosen the nerve throughout its course before any effort is made at avulsion.

INTRACRANIAL OPERATIONS—SURGERY OF THE GASSERIAN GANGLION.

Keen and others have reported the return of the former neuralgia after resection of the infraorbital and infradental nerves for long distances. In one of Keene's cases 25 mm. of the infraorbital nerve was removed. Reunion of the nerve took place and the former pain returned. Since the rotundum and the infraorbital foramen, it is evident that the removal of 25 mm. of the trunk would not include all the branches likely to be neuralgic. I have seen a number of cases in which it was alleged that the nerves had been removed down to the foramen of exit from the skull, yet which continued to suffer from the former pain. In several of these I undertook further operative measures and found that much of the nerve was still intact, having been overlooked in former operations, or possibly its complete removal was considered unnecessary. The final removal of the nerve with its branches gave satisfactory relief. Knowledge of these facts has led me to suspect that intracranial surgery of the trifacial nerve is sometimes not as complete as it should be, and that, were it complete, surgery of the ganglion would be less fre-

quently necessary. However, many of the world's best surgeons of the last quarter century have believed that often the ganglion is the sole seat of the pathology, and this belief has grown rather than lessened, until now many, as Frazier, believe that the surgery of the trifacial nerve should be wholly intracranial. Among those who have developed the surgery of the ganglion should be mentioned Mears, Rose, Hartley, Krause, Abbe, Cushing and Frazier. The earlier operations of Mears and Rose are now obsolete, while those of Hartley and Krause have been superseded by the simpler and safer plans of Abbe, Cushing and Frazier. I prefer the technic of Frazier, which has been published, and needs no detailed repetition. A few points should, however, be discussed. The great mortality of the earlier operations was due to attempts at removal of the ganglion itself, with its attendant hemorrhage, shock and sepsis. Much was gained when Spiller discovered that section of the sensory root of the ganglion gave complete and permanent relief from the neuralgia as Frazier has proven by cases remaining cured after a period of 15 years. Abbé also simplified the operation by contenting himself with the division of the second and third branches of the trifacial at the foramina of exit. This operation, strangely enough, maintains that since the neuralgia is practically always in these two divisions of the nerve it is not necessary to consider the ophthalmic nerve. Cushing and Frazier adopted certain proven points of safety in the methods of Spiller and Abbe, and then simplified the method of approach to the ganglion, all to the end that a low mortality is now the rule. The aim of the operator now is seldom to remove the Gasserian ganglion, and hence many of the unfortunate surgical possibilities of the former operation are obviated. The plan of section of the sensory root of the ganglion, as advocated by Spiller, and extensively practiced by Frazier is no doubt the best procedure. The intracranial operation of section of the sensory root, while requiring an extensive surgical training for its performance, and a clear knowledge of the structures dealt with, is but slightly more difficult than some radical mastoid operations, especially when the latter operation deals with labyrinth complications.

When the dura has been sufficiently exposed by the method of Frazier the first difficulty met with by the operator is hemorrhage. The bleeding may not be severe, but is nevertheless troublesome and requires time and patience to control. Much of it arises from the venous pincta resulting from the separation of the dura from the skull and requires gauze packing on either side while the operator

continues to work through a narrowed channel under the spatula which elevates the brain. As the foramen ovale is approached the middle meningeal artery may be found directly in the necessary path of procedure. If it can be hooked up at the foramen spinosum and sufficiently isolated it is best disposed of by ligation. Every care should be taken not to tear it off unless first ligated. The vessel may be compressed in the foramen by surgeon's wax. Johnson, who reports thirteen operations on the ganglion without a death, advocates ligation of the common carotid artery as a preliminary measure. This is usually unnecessary if caution and skill are used in dealing with the middle meningeal. Because of anomalies in the location of the middle meningeal artery the operator never knows where he may find it since it may be anterior, external or posterior to the foramen rotundum.

The plan of section of the sensory root, and the avoidance of attempts to remove all or a greater portion of the ganglion has lessened the danger from injury to the cavernous sinus, an accident formerly common, distressing and often fatal.

The next greatest difficulty lies in sufficiently exposing the region of the ganglion by lifting the brain from the adjacent floor. The first requisite to overcome this difficulty is to loosen the dura from the bone around the entire periphery of the opening into the skull for a distance of one-half to three-quarters of an inch. This releases a larger area of dura and brain to freedom of movement required in spatula retraction. With the area of dura thus loosened the broad spatula of Cushing is effective in exposing the operative field if held by an intelligent assistant. The considerable depth of the ganglion requires artificial illumination, and in this the trained laryngologist should feel at home.

With a dry field, a good exposure and with the depth of the wound well lighted the dura is cut around the third division of the nerve at the foramen, is then slit backwardly over the ganglion, the outer surface of which lies exposed. The sensory root lies most superficial, is largest, and when freed from dura may be isolated and severed. The wound is closed exactly as in other extra dural brain operations. Since the field of operation is clean, if no infection is introduced the wound heals almost painlessly, quickly and without noticeable scar or deformity. In long standing, severe cases of "tic," operation on the ganglion is no doubt the most satisfactory of all surgical procedures.

A STUDY OF THE AURAL COMPLICATIONS OF THE RECENT INFLUENZA EPIDEMIC WITH SPECIAL REFERENCE TO THE CLINICAL PICTURE.

DR. FREDERICK T. HILL, First Lieut. M. C., Ft. Oglethorpe, Ga.

The recent epidemic of influenza has shown certain very interesting features from an otological standpoint. Otitis media was not a very frequent complication, but those cases in which it did develop were of perfectly characteristic type and showed the clinical picture we had come to consider as influenza. There were, however, some unique features which are well worth considering.

Out of a series of 6,870 cases of influenza occurring at the U. S. A. General Hospital, No. 14, there were only 120 cases of acute suppurative otitis media. There were 1,600 cases of pneumonia in this series and 66 of the cases of otitis media occurred among these. Of the 120 cases, 17 were bilateral, 16 of these occurring in the pneumonias; 21 cases developed mastoids, 2 of these being bilateral; one case developed otitic meningitis and died. The percentage of influenza which developed acute, suppurative otitis media as a complication was 1.75. About 50 per cent of these occurred in cases having pneumonia, the percentage of these being 4.12. The percentage occurring in cases uncomplicated by pneumonia was 1.02. Of the series of 6,789 cases, there were 6 cases of acute frontal sinusitis and 3 of ethmoiditis. No maxillary sinusitis was noted. There were 16 cases of acute laryngitis, 16 cases of acute follicular tonsillitis and one of peritonsillar abscess. There was a small number of acute catarrhal otitis media reported. For acute respiratory diseases this seemed to be a small percentage of aural complications. It is safe to say that none of these were overlooked, as these cases were under constant observation and there are always competent otologists available to examine suspected cases. Each case was seen early and immediate treatment instituted. However, there are certain grounds for error in these figures as on the day they were compiled, there were 173 cases of influenza still in the hospital and potential subjects of aural complications. We must conclude from these figures that the percentage of otitis media occurring in influenza is comparatively small, the greater proportion occurring in those cases complicated by pneumonia.

However, those cases of otitis media which did develop as a result of influenza, showed certain very interesting, if not unique

features. In practically every case the type ran true to form. This seemed to show distinct pathology, so that it was necessary for us to revise our old symptomatology. This pathology seems to be best described as acute hyperplasia, or hyperplastic edema of the mucous membrane of the middle ear. The onset was quite sudden, generally occurring in from the first to the third day of the disease. A certain number of cases of otitis media showed clinical pictures identical with those in the influenza cases but had absolutely no other manifestation of the disease. They reported to the hospital showing what we came to regard as influenzal otitis media and were treated as such, but of course were never diagnosed as influenza.

The first symptoms were intense pain in the infected ear together with, or sometimes preceded by, a feeling of fullness. The headache and malaise occurring in these cases must be attributed to the general affect of the influenza and the temperature, which ran from 101 to 104, must be considered in the same way. The otitis media of this type, but occurring in otherwise non-influenza cases, ran a normal temperature. Otoscopic examination of the case within two or three hours after the onset of pain would show distinctive changes in the membrana tympani, always of a vesicular type. In almost every case there was marked redness and some bulging of Shrapnell's membrane. There was injection along the handle of the malleus. The light reflex was usually present and often the anterior portion of the membrana tympani quite normal. The superior, posterior quadrant showed the greatest change. There was frequently a large hemorrhagic bleb bulging outward even for two or three millimeters. The short process often could be seen. This was the typical early case seen within two or three hours after the onset.

The cases seen later showed more swelling, especially of the superior posterior portion, diffuse reddening of the membrana tympani and loss of all normal landmarks. The distinctive feature was a bleb formation. Often there were two or three of these, always superior, either anteriorly or posteriorly and often dissected marginward beyond the annulus end to the wall of the external auditory meatus. They were of considerable size, often being five or six mms. in diameter, obscuring a good view of the membrana tympani. The eccentric layer of the squamous cell epithelium making up the stratum cutaneum of the membrana tympani readily explains this travelling of the blebs laterally to the canal wall. There was no tenderness over the mastoid process at this stage. Incision of the blebs evacuated a small amount of bloody serum. In the older cases this could be expressed from the vesicles only with some effort, as

if some clotting or organization was taking place. These blebs were true vesicles beneath the stratum cutaneum of the membrana tympani. After evacuation of these, the drum appeared red and swollen with the marked involvement of Shrapnell's membrane previously mentioned, the degree or extent depending upon the time involved. Incision of the membrana tympani in the earlier cases gave relief to increased pressure within the middle ear, followed by considerable bleeding. Later, this became a profuse, sero-sanguineous discharge. In the cases seen at a more advanced stage, incision evacuated this sero-sanguineous discharge immediately.

The pain generally subsided about two hours after the incision of the membrana tympani. The sero-sanguineous discharge continued rather profusely for several days then gradually changed in character to a thin purulent discharge which later became of thicker consistency, apparently due to secondary infection.

The nose and throat examination of these cases showed considerable congestion of the mucous membrane throughout, with more or less purulent secretion in the epipharynx, and a diffuse, acute pharyngitis. As epistaxis was a fairly frequent incident with influenza, occasional excoriations and scabs were seen on the nasal septum, anteriorly in Kisselbach's area.

Occasionally there was laryngeal involvement, a diffuse, inflammatory process involving the false cords and epiglottis with varying degrees of swelling and redness of the true cords and consequent limitations of motion. In some cases it was quite impossible to see the cords. Two cases showed hemorrhagic vesicles of the true cords. These were unilateral and situated about the junction of the anterior and middle third. Later these ruptured and gave the appearance of superficial ulcerations about 3 mms. in diameter. These healed up with treatment in about ten to twelve days.

Presumably we had a very acute, suppurative otitis media, rapid in onset, of naso-pharyngeal origin. Almost from the outset a marked epitympanic involvement became noted. An outstanding feature was the early obliteration of the superior angle of the external auditory canal and membrana tympani, sometimes seen on the second day of the disease. With this there was increased swelling of the membrana tympani itself, and often further bleb or vesicle formation, though after incision of the drum, no new extra-marginal blebs were seen. With the obliteration of the superior angle, Shrapnell's membrane became pushed downward. The line of incision frequently was depressed inward by the increased thickness or swelling of the membrana tympani. Often a bleb or vesicle would protrude out through the incision.

One case showed a large bleb in the upper limit of a right angle incision of the membrana tympani. The process was apparently a subsiding one and this was not disturbed. The next day this incision was smaller and the bleb had a balloon-like appearance. This became a pedunculated sac of considerable length, but narrow pedicle, which gradually became choked off altogether with a final closure of the opening. This was removed and gave the microscopic appearance of mucous membrane.

Generally there was what seemed to be a hyperplasia of the mucous membrane of the middle ear. Sometimes this protruding through the opening in the membrana tympani would give the appearance of granulation tissue, except that it did not bleed so easily. In case this hyperplastic tissue coming through the membrana tympani high up dissected away the superior angle of the drum, it gave the appearance of a polypoid mass. This was freely movable without discomfort to the patient and did not bleed. Upon subsiding, this gave a rough, bubbly appearance to the membrana tympani. The serous discharge showed considerable tendency to coagulate, especially over the incision, and it was frequently necessary to remove this to allow drainage. Frequently secondary incisions were required. Mastoid tenderness or edema was not evidenced at this stage. In certain of the cases, the process now began to subside and go on to an uneventful convalescence. The discharge ceased and the middle ear began to resolve with reappearance of the normal landmarks and the obliteration of the incision. The last remaining sign of the infection was the irregular thickening and swelling of the superior posterior quadrant of the membrana tympani, giving it an uneven, bubbly appearance.

In other cases, in from ten to twelve days from the onset, the whole superior canal wall would become flattened. This was so marked as to be an absolute drooping and occurred in practically every case with occasional pushing forward of the posterior canal wall at its innermost portion. By this time the discharge had changed to a thin purulent character. Thus, the typical clinical picture would be, a suppurative otitis media of ten to twelve days duration, showing a thin purulent discharge and absolutely flat superior canal wall, the membrana tympani red and swollen, especially in the superior portion, with or without bleb formation, and all normal landmarks obliterated. Usually there was no mastoid tenderness or edema.

Hitherto, the flattened superior canal wall has been considered one of the most reliable signs of a suppurative mastoiditis and frequently an indication for operation. In these cases we found the reverse to

be true, both by clinical observation and x-ray and also by operation, disclosing in one case a normal mastoid and moderately congested ones in two cases.

X-Ray examinations of cases at this stage, showed simply a slight obscuring of the mastoid, as well as a cloudiness about the antrum or a normal cell picture. Destruction of the cell walls was not shown. Cultures carefully taken and planted upon blood agar showed growths of streptococci in practically every case. Occasionally an admixture of staphylococci was also found.

From this point the cases varied somewhat. In many there was a lessening of the discharge which, however, persisted in smaller degree for a week or ten days. The middle ear gradually resolved and landmarks appeared. About the last sign to disappear was the flattened superior canal wall. Even after the membrana tympani had regained almost normal appearance and color, a certain percentage ran along for several days without showing much change, and then, with some increase in the discharge, there was a distinct thickening of the mastoid periosteum with occasional slight tenderness and edema over the tip. Sometimes these showed a slight rise in temperature and the patient complained of pain at night. They were diagnosed as mastoiditis and operation confirmed it. Some cases, notably in the pneumonias, showed a thick, creamy, purulent discharge, increased in amount, and a definite boggy appearance of the membrana tympani. There was no mastoid tenderness, but always a thickening of the periosteum. These also came to operation as mastoiditis.

Of the 21 cases which came to mastoid operation, one showed a normal mastoid, two simply a congestion of the mucous membrane of the cells, while the rest were pretty much of a characteristic type. They showed a hemorrhagic cortex which, upon removal, revealed more or less free pus. The bone was not broken down. In all cases the cell structure was preserved, though somewhat softened. Often there were granulations in the cells. Frequently there was considerable involvement of the zygomatic cells. In some cases the bone over the lateral sinus was rather soft but not broken down. In two cases there was erosion of the tegmen antri. For the most part, the cases had uneventful convalescence, the middle ear becoming dry within two or three days and the wound healing nicely. One of the cases mentioned above, with erosion of the tegmen, developed a plastic leptomeningitis and died. This was complicated by a severe pneumonic process involving both lungs.

Blood cultures were taken in some of these cases and were sterile except in one which showed a growth of streptococcus. This was a

double mastoiditis in a severe case of lobular pneumonia, followed by a fibrinous pleurisy. This case was admitted to the hospital October 10, 1918, with a diagnosis of bronchial pneumonia, influenza type. He had a severe course of pulmonary involvement. On October 26, he complained of pain in both ears. Otoloscopic examination showed both membrana tympani bulging and considerable redness of Shrapnell's membrane and injection of the handle. Incision evacuated sero-pus. Two days later he developed a fibrinous pleurisy of the right lower lobe, and on the 20th, 20 ccs. of turbid fluid were withdrawn from the plural cavity. His otitis media ran the usual course until about the tenth day after onset, when the discharge was increased and it became purulent in character. The superior canal walls were flat, the membrana tympani swollen and boggy and there was tenderness and some edema over the mastoids. His temperature averaged about 101 P. M. and his lungs showed considerable involvement. Two days later it was deemed necessary to operate and a double mastoid operation was performed under nitrous gas and oxygen anesthesia. Both mastoids showed a hemorrhagic cortex with some free pus. The cells were not broken down but were somewhat softened. The mastoids were completely exenterated with no exposure of the sinus or dura. Two days later both middle ears were dry and the wounds clean. On the third day the temperature rose to 104 in the afternoon. There was no history of any chill. White blood count 38,000; differential, polymorphonuclear 92, small mononuclear 5, large mononuclear 3. Examination of fundi negative. Throat negative. Examination of lungs showed: "total absence of breath sounds right lower lobe, posteriorly dull to sixth rib." The next day he was somewhat better and two days later his white blood count was 10,000; differential, polymorphonuclear 84, small mononuclear 12, large mononuclear 3, transitional, 1. Blood culture taken 48 hours previously showed a growth of streptococci. The next day, white blood count was 7,000, polymorphonuclear 74, small mononuclear 18, large mononuclear 7, transitional 1. His temperature gradually came down by lysis and was normal on the fourth day. There was a question as to whether this temperature was due to the involvement of either one of the sinuses or to the pulmonary condition. The medical consultants felt that all these cases of influenza-pneumonia were bacteremias and that the blood picture might be due to this. The patient was studied very carefully. Further operative procedure was of course unnecessary.

Here we had a very acute type of otitis media. The only organism obtained was streptococcus. The onset was sudden and marked with intense pain. The otoscopic picture was of the influenzal

type: vesicular condition of the membrana tympani, with intense ballooning and large blebs travelling beyond the margins of the drum to the canal wall. At first the process was confined to the superior posterior portion of the membrana tympani and Shrapnell's membrane, but soon the whole drum became involved. The discharge was sero-sanguineous, later purulent. The swelling of the upper part of the membrana tympani with later protrusion of the mucous membrane. The upper portion of the middle ear contains considerably more mucous membrane than the lower. We have the anterior and posterior pouches of the drum. We have the chorda tympani nerve, the stapedius and tensor tympani muscles over which is reflected the mucous membrane, and the fold of the mucous membrane running from the promontory to the long process of the incus. We have the external and internal spaces of the attic divided by a fold of mucous membrane; the upper incudo-malleolar fold. The outer segment of the attic is again divided into an upper and lower incudo-malleolar space by a fold of mucous membrane running horizontally from the anterior ligament of the malleus to the short process of the incus and attached to the head of the malleus and body of the incus and to the osseous wall of the attic laterally. Then we have the mucous membrane reflected over the external ligament of the malleus, separating this lower space from Prussek's space. This gives a preponderance of mucous membrane in the upper portion of the middle ear and hyperplasia of this would account for the marked epitympanic involvement seen in these cases. Another noteworthy feature was the flattened superior canal wall, seen first as an obliteration of the inner superior angle of the membrana tympani and canal. Ballinger considers this a sign of marked suppuration in the border cells of the mastoid and usually a sign for operative interference. Our experience did not bear this out. One case which showed absolute flattening and no signs of external otitis, revealed at operation a perfectly normal mastoid. Other cases which showed similarly drooping canal walls, recovered without operation, this sign persisting to the last. While there may have been a certain degree of mastoiditis which healed, it certainly was not a marked suppuration.

The inner portion of the upper posterior, osseous, external canal contains numerous fine canaliculi. This probably explains the canal wall edema. May not this drooping be simply an extension laterally of the epitympanic process, already mentioned and seen first as an obliteration of the upper angle? The membranous canal is less firmly attached to the osseous in this plane. This may be aggravated

by an inflammatory process extending from the epitympanic space and possibly aditus, via. the canaliculi. This drooping canal wall was repeatedly seen in cases that otherwise were not clinically typical of suppurative mastoiditis. External otitis was ruled out in every case. This sign was very persistent, but about the last to disappear and remaining sometimes for about two or three weeks. That this sign was not indicative for operative interference was evident.

X-Ray examination of these cases showed cloudiness or obscuring of the cells of varying degree, depending upon the duration of the process. No case showed complete destruction. Operative findings bore this out. Many cases which showed a flattened superior canal wall and a cloudy X-Ray of the mastoid, cleared up without operation. The lining of the mastoid cells and of the antrum is flattened epithelium continuous through the aditus with that of the tegmen tympani. Presumably a hyperplasia or at least a hyperemia existed here, modified somewhat from that seen in the middle ear. The epithelial cells are cuboidal on the inner side of the membrana tympani and over the promontory and cylindrical on the floor and posterior wall. This would account for the slight clouding of the X-Ray picture in the cases in clinically suppurative mastoiditis. Indeed all these probably were cases of mastoiditis but not necessarily suppurative mastoiditis which we may generally consider as the type requiring operation. The distinction must be kept clear.

The course of this disease at first showed a very acute hyperemia of the middle ear, of sudden onset, with redness, bulging and vesicular formation on the membrana tympani. This soon became a cellulitis, with an acute hyperplasia of the mucous membrane. The same course of events proceeded in varying degree into the mastoid cells, although not evidenced by subjective symptoms, being only shown by the x-ray findings. There was a sero-sanguineous discharge, redness and swelling of the upper portion of the drum, obliteration of the superior angle of the canal and protrusion of the mucuous membrane of the middle ear through openings in the membrana tympani. This was mainly an epitympanic involvement because of the anatomy of the epitympanum. Further extension resulted in the flattening and drooping of the superior and supero-posterior canal wall.

The original infecting organism, whatever it was, was not suppurative in its action and pus formation did not occur until we had a secondary infection, following a breaking down in the protective qualities of the mucosa. This was presumably streptococcus. At this purulent discharge now resulted but the drooping canal wall was

independent of these for this sign was seen in cases which never went on to a purulent discharge.

The picture at this stage was that of a true suppurative otitis media and one of two things took place. Either this subsided and became convalescent in a varying degree of time, or the suppuration extended to the mastoid cells and resulted in true suppurative (operative), mastoiditis. This was evidenced sometimes by a bogginess of the membrana tympani and slight tenderness and edema over the mastoid, but most constantly by an increase in the amount of the discharge and the thickening of the mastoid periosteum, giving a velvety feeling on gentle palpation, especially upon comparison with the other, presumably normal, side. This stage was reached in from eight to fifteen days.

From this we may conclude that the signs indicative of operation for suppurative mastoiditis following influenzal otitis media are: a history of otitis media with discharge for from eight days to three weeks, often quieting down and then starting up again; an increased discharge of purulent character; a thickened mastoid periosteum and possible mastoid tenderness and edema and a boggy membrana tympani. The drooping superior canal wall is not reliable.

Some otologists take the view that every case of suppurative otitis media, going on for over three weeks, should be operated on, if for no other purpose than to preserve hearing. This of course is of great importance, but we also must consider the length of time involved before putting men back to duty as effectuals. Some of these cases which ran on for longer than three weeks but which did not show the findings indicative for operation mentioned above, subsided and were discharged as cured from four to six weeks after the onset. Hearing upon discharge was considerably lowered but prognosis was good for improvement. Subsequent examination, in cases which were possible to follow, showed practically normal hearing in from two to three weeks after discharge from hospital.

In two cases it was possible to remove the tissue protruding through the opening in the membrana tympani and subject it to microscopic examination. The pathological work was done by Major Robert A. Keilty, M. C., who reports as follows:

Case A. "The tissue is that of a small piece of mucous membrane taken from the middle ear in which the submucosa is the seat of an acute exudate characterized by a diffuse polynuclear infiltration, some fibrin and edematous fluid. There is a hyperplasia of endothelial cells, many from the perivascular lymph spaces of the small capillaries, while the blood vessels are markedly congested.

The protoplasm of the epidermal epithelium is granular and shows some structural reduction."

Case B. "The section is a small piece of mucous membrane taken from the middle ear. The process is primarily an exudate one in the submucosal positions. This is characterized by a diffuse polymorphonuclear leucocyte infiltration and some fibrin with edematous fluid. In addition there is hyperplasia of endothelial cells arising from the perivascular lymph spaces of the small capillaries. The vessels are congested. The mucosal epidermis shows granular protoplasm, suggesting a reduction in its integrity."

The plan of treatment followed out was early examination of all suspected cases and prompt incision of the drum when indicated. Insertion into the canal of dry gauze wicks which were frequently changed, was employed on all cases in the initial stages and in most cases, throughout the course of the disease. A certain number of cases in the later stages, were put upon irrigation but the best results obtained were with the dry wick treatment. It was necessary to carefully clear out the canal and remove any coagulated serum from the incision daily, for the first few days, during the course of the sero-sanguineous discharge.

From this series we have selected five cases as typical and presenting features of interest:

Case 1. The patient entered the hospital October 2, 1918. Age, 23; previous occupation farmer; family history negative; past history measles, mumps and pneumonia. Complained of general malaise, headache and sore throat. Diagnosis, influenza. Physical examination negative. Temperature averaged 102 for six days. On the third day complained of pain in the left ear. Otoscopic examination showed large vesicle on the posterior canal wall, almost obscuring view of the drum, with bleb on the posterior superior quadrant. Incision evacuated sero-sanguineous discharge. Ran a usual course of suppurative otitis media until the tenth day; the discharge became purulent in character with some edema of the posterior canal wall. Five days later this wall was distinctly flat. There was no mastoid tenderness or edema; hearing 4-20. Two days later or twenty days after onset, the discharge had almost subsided and the middle ear was almost resolving but the canal remained flat. Five days later the middle ear was dry, membrana tympani almost normal color but the canal flat; hearing 4-20. Sent to duty. X-Ray showed an obscured mastoid.

Case 2. Admitted to hospital October 12, 1918. Age 21; family history negative; past history measles, whooping cough, pneumonia,

malaria three years previous. Complained of headache, malaise and cough. Diagnosis influenza. Two days later complained of pain in right ear. Otoloscopic examination showed bulging membrana tympani with vesicles in the anterior and posterior superior quadrant, extending up to the canal wall. Incision evacuated sero-sanguineous discharge. Discharge remained serous and slight in amount for eight days when he again had pain in the ear, and the drum seemed to be bulging. This was incised again. Four days later the drum was again bulging and the superior canal wall was flat. Membrana tympani incised. The next day discharge was purulent, the canal wall flat and membrana tympani red and swollen. Simple mastoid operation was performed disclosing a normal mastoid. Uneventful convalescence.

Case 3. Admitted to hospital October 6, 1918. Age, 22; previous occupation laborer. Family history negative. Past history negative. Complained of headache, malaise, pain in the left ear. Physical examination showed few coarse rales in the lungs. Diagnosis influenza. Otoloscopic examination showed vesicles on the canal wall and membrana tympani bulging. Incision evacuated sero-purulent discharge. Otitis media improved somewhat and his lungs cleared up. There was slight discharge up to the tenth day, when the membrana tympani was swollen and bulging posteriorly. This was incised again. Two days later the superior canal wall was drooping. The membrana tympani was swollen and bulging. Again incised. The next day the discharge was thin, purulent in character. There was no mastoid tenderness or edema. There was no change in the canal although the middle ear improved until seven days later, the light reflex could be seen. Soon a tit-like process in the posterior quadrant, apparently the hyperplastic mucous membrane through the incision, was seen. There was uneventful convalescence. He was sent to duty November 16, 1918. X-Ray showed "left mastoiditis." Hearing on discharge; left ear 1-20, upper limit normal limit 1-28 rinne 6-6. Hearing two weeks later 20-20.

Case 4. Admitted to hospital October 9, 1918. Age 30; previous occupation farmer; family history negative, except that mother died of tuberculosis at age of 65. Past history; measles, mumps, and whooping cough in childhood; suppurative otitis media right ear ten years ago. Following "cold" one year ago, became very deaf; treatment was of no benefit. Deafness has not increased in the last few months. Present history: had "cold" three weeks previous to admission; sore throat for one day; complained of malaise and headache. Temperature on admission 100. General physical condition negative.

Otoscopic examination showed on the right some congestion along the margin of the membrana tympani which was retracted. The short process was unduly prominent and the light reflex distorted. Left ear showed similar condition. Heard only loud conversation with the left ear, nothing with the right. Rinne negative. Galton whistle only heard with the left ear. Diagnosis: influenza, nerve deafness on the right. Wassermann was negative.

The patient ran the usual course of influenza until on the seventh day, he developed a lobular pneumonia; temperature 104. Medical examination as follows: "dry rales right, dullness over right back, harsh breathing, mucous rales corresponding to base of lower lobes. Slow increase in whispered voice. Few mucous rales and dry crackles over right posterior axillary region." He complained of no pain in the ears but the following day, October 17, 1918, his right ear was discharging quite profusely. This discharge was sero-purulent in character. The next day, examination showed a small mass resembling granulation tissue at the junction of the superior canal wall and membrana tympani. There was no pus exuding from this. With a probe, one could feel denuded bone and a tract leading to the epitympanum. There was little change the next day. This mass was about the size of a small pea and covered the short process. There was some exudate on its anterior portion. There was considerable protusion of Shrapnell's membrane. October 20, the patient's temperature was normal, and on the following day medical examination showed: "lungs clearing up, very few rales at right base." October 22, otoscopic examination showed a moderately thin, purulent discharge, the superior angle of the canal and membrana tympani dissected downward, with the mass previously mentioned apparently hyperplastic mucous membrane. There was a large irregular perforation on the inferior portion of the membrana tympani. No mastoid tenderness or edema. October 23, examination showed the lungs to be clear, no rales. The discharge from the ear was increased both in amount and consistency and was pulsating. There was thickening of the mastoid periosteum. X-Ray examination showed: "right mastoiditis, all cells obscured." Culture from the ear showed both streptococcus and staphylococcus. October 24, simple mastoid operation was performed revealing the usual type of influenzal mastoid. Culture taken at operation showed streptococcus. Uneventful convalescence.

Case 5. The patient was admitted to the hospital October 9, 1918, Age 23. Previous occupation, coal miner. Family history negative. Past history, negative except for severe contusion of left occipital

region from a fall fourteen years ago following which he was unconscious for an hour. Complains of weakness, malaise, and cough. Diagnosis: influenza, lobular pneumonia. October 12, complained of pain in right ear. Examination showed the drum to be red and bulging with land-marks obliterated. Incised with resulting purulent discharge. October 15, complained of pain in left ear. Examination showed drum to be red and bulging. Incision evacuated pus. His pulmonary condition greatly improved and he was transferred to the ear department. October 21, otoscopic examination: right ear profuse, purulent discharge, the superior canal was slightly flattened; membrana tympani red and swollen; good drainage; no mastoid tenderness or edema. Left ear: profuse muco-purulent discharge membrana tympani red and swollen, slight periosteal thickening over the mastoid. Irrigations ordered for both ears. November 1, drainage from the right ear was insufficient and the drum was again incised. Left ear showed no change. X-Ray showed slight obscuring of both mastoids. November 2, left simple mastoid operation, disclosing a large diploic mastoid containing granulations and free pus. Mastoid was exenterated without exposing the sinus or dura. Temperature had been normal since transfer to the ear department. November 3, temperature rose to 102.8; considerable discharge from right ear, the superior canal wall showed marked flattening and there was some thickening of the mastoid periosteum. November 4, right simple mastoid operation disclosing large diploic mastoid containing pus and granulations. There was a small perforation off the tip. Small area of dura exposed above antrum. November 5, he was in good condition, both wounds clean, very little discharge from middle ear. There was some tenderness and swelling of the neck on the right side. That night his temperature was 100. The next day medical examination showed "lungs not completely cleared up, still a few signs in the right base. Indeterminate rales and increased voice sounds. Temperature 102, no chills, some headache, especially on right side, cerebration slow. Voice somewhat thickened; neck was tender and swollen especially on right side. No retraction and stiffness seemed to be accounted for by cellulitis. No spontaneous nystagmus; knee jerks present; no Kernig or ankle clonus. Plantar reflex normal. Slight discharge from right middle ear; left ear dry; both wounds clean. Fundi normal. The temperature that afternoon was 104. Dressing taken down and packing removed from wounds, both of which were clean. Hearing preserved in both ears; medical examination showed "voice sound decreased, axilla and posteriorly, probable fluid or massive pneumonia."

Aspirated and no fluid obtained. White count 23,600; differential; polymorphonuclears 91, small mononuclear 9. November 7: blood culture negative after forty-eight hours. Medical examination showed marked activity in his pulmonary condition. Both mastoid wounds clean and did not seem to be the cause of temperature. Temperature that afternoon 104.6, some vomiting, not projectile in character. Fundi negative. November 8: neurological examination by Major Coleman, negative except for slight easily exhausted ankle clonus on the right. November 9, epistaxis similar to that commonly seen in influenza. November 10, patient considerably worse; cloudy sensorium; neck stiff; positive Kernig and ankle clonus. Examination of lungs showed "extensive pulmonary involvement, massive consolidation in left lower lobe." Lumbar puncture; fluid not under increased pressure but thickened and cloudy. Smear showed streptococci. Fundi negative. Condition precluded any thought of operative interference. Failed rapidly and died November 11, 1918.

Necropsy showed a marked pastic lepto-meningitis, undoubtedly extending from erosion of tagmen antri on the right. There was an obliteration of the left lateral sinus, evidently of some duration and probably dating back to the old injury fourteen years ago.

Lungs showed extensive lobular pneumonia.

Here our intra-cranial situation was overshadowed by the marked picture of pulmonary involvement. We were unable to make a definite diagnosis of meningitis until the day before he died.

CONCLUSIONS.

1. In our experience during the recent epidemic, otitis media was an infrequent complication of influenza and occurred more frequently in cases developing pneumonia.

2. This type of otitis media shows first a hyperemia and then an acute hyperplasia or hyperplastic edema of the mucous membrane of the middle ear.

3. This gives a certain definite and characteristic picture including a drooping of the canal wall. This last sign is not indicative of a suppurative mastoiditis.

4. The operative signs indicative of suppurative mastoiditis are: increased purulent discharge and thickened mastoid periosteum, Mastoid tenderness and edema, if present, together with these signs, are added arguments.

A CASE OF FIBROSIS OF TISSUES LINING THE EXTERNAL AUDITORY CANAL, AND TISSUES OVERLYING THE MASTOID.

DR. L. W. DEAN and DR. MARGARET ARMSTRONG, Iowa City, Iowa.

The patient was a white male, age twenty-two years, German descent. He dates the beginning of his trouble to ten years ago. At that time he was subjected to a very severe pull on the left ear, which seemed to tear the ear loose from the head. Since that time the ear has stood out from the head very prominently. The deformity has been very marked. The patient first noticed an impairment in hearing about eight years ago.

One week previous to the patient's entrance into the hospital, he developed a severe pain in the left ear which persisted until the time of his admittance. There has never been any discharge from the ear. The pain which he has had has been a dull ache, constant, with an occasional sharp pain shooting down into the neck. The loss in hearing has been gradual, increasing during the last eight years, until two weeks ago, when it became much worse.

There is nothing of any moment in the family history of the patient, or in his personal history up to date.

Examination of his ear revealed nothing abnormal.

Examination of the left ear: Hearing: whispered voice, two feet; spoken voice, twenty-five feet. Pulling the auricle up and back so as to open the external auditory canal which was closed, the whispered voice was ten feet, and the spoken voice thirty-five feet. The external ear protruded outward and forward, almost at right angles to the head. The position was identical with that which we often find in very extensive subperiosteal mastoid abscess. Posterior to the ear was a swelling over the mastoid region, simulating in shape that of a large subperiosteal abscess. This swelling was not tender—there was no evidence of inflammation of the skin, or underlying structure. The swelling was soft and velvety. It did not dent, and the mass felt as if it would have the consistency of a nasal polyp. The external canal was closed because of a swelling involving the roof, posterior wall, and floor of the canal. The walls of the canal could be readily separated. There was no tenderness either in the canal or over the mastoid. The tympanic membrane was poorly seen; it had a moist appearance, and was markedly reddened

in the upper posterior quadrant. There was no noticeable bulging. The Eustachian tube was open; no fluid in the tympanum.

The x-ray picture showed the right mastoid to be of the large cellular type. The left mastoid was of the juvenile type. The cells of the left mastoid were blurred.

On November 22, 1917, the patient was operated. The usual incision for a mastoidectomy was made. Underneath the skin was a large mass of soft fibrous tissue; this was intimately attached to the cartilaginous portions of the external auditory canal. Over the mastoid this fibrous tissue was one and one-half inches in depth. There was no demarcation line between the fibrous tissue and the soft structures of the external auditory canal. These structures seem to gradually fuse into the fibrous mass. The bulk of this fibrous tissue was removed; all that over-laid the mastoid was removed. Extending superiorly, posteriorly, and inferiorly to the mastoid, was fibrous tissue, which intimately fused with the surrounding structures. All of this was not removed. The posterior wall of the cartilaginous and fibrous portions of the external auditory canal was removed. The bony posterior wall was removed as is done in the so-called antro-meatal mastoid operation. Some of the superficial mastoid cells were found to be diseased; these were removed by curettage. The wound was closed by sutures, and the usual dressing for an antro-meatal mastoid operation was applied through the meatus. The patient had a very nice result from this operation.

A few months later he returned with the ear protruding as before, and the same kind of a tumor present. He was re-operated. This time, a larger incision was made, and the fibrous tissue was followed to its termination in all directions. The fibrous tissue fused posteriorly with the periosteum of the skull; inferiorly, it fused with the fascia of the upper portion of the sternocleidomastoid, superiorly with that of the temporal muscle.

A wide incision was made through all structures with which it intimately fused. All parts of cartilaginous and fibrous portions of the external auditory canal with which it fused, were removed. This fibrous tissue extended back to a distance of three inches from the external ear. An elliptical piece of skin posterior to the external ear, was removed so that when the stitches were applied the ear would be brought back to its proper position. The wound was closed, and drainage secured through the external canal.

A note was made that the tumor was intimately attached to underlying periosteum, to the fascia of the sternocleidomastoid

muscle, to the fascia of the temporal muscle, and also to the soft portions of the external auditory canal.

At this time, one year following the second operation, there is no sign of recurrence of the mass. There is no deformity, or displacement of the external ear. The patient reports that he has no difficulty in hearing with the ear.

The following is the pathological report:

On October 28, 1917, tissue from the tumor-like mass described above was sent to the laboratory for pathological diagnosis. The growth showed a soft tissue, gelatinous in consistency, white in color, translucent and traversed by a coarse net-work of white fibrous bands. In short, it resembled the contents of a rather firm nasal polyp. Microscopically, the section was composed largely of connective tissue cells, widely separated from each other by a nearly homogeneous intercellular substance. The connective tissue cells were without any definite arrangement and they varied greatly in size, shape, staining reaction of their nuclei and the amount of cytoplasm present. Along the edge of the section was a border of stratified squamous epithelium in which there were hair follicles and sebaceous glands. There was no line of demarcation between the subcutaneous connective tissue and the tumor substance. The tissue was quite vascular. Most of the blood vessels had thick walls, but some were very thin walled, apparently little more than channels lined with endothelial cells. In some areas, especially near the blood vessels, the interstitial spaces were infiltrated with plasma cells, lymphocytes and polymorphonuclear leukocytes.

Again, on January 17, 1918, following the second operation, the tumor tissue removed was sent to the laboratory. Grossly its appearance was identical to that removed at the first operation, and the only microscopical difference was in the relatively small number of wandering cells present. Only occasional small groups of lymphocytes and plasma cells being seen scattered here and there among the connective tissue cells. The tissue removed at the first operation was acutely inflamed as a result of the mastoid infection while at the time of the second operation this inflammation no longer existed.

This tumor-like growth was no doubt a fibrosis, the result of the traumatic injury which the tissue suffered when the external ear and surrounding tissue was torn away from the underlined bone. The ear being loose and somewhat pendulant, it is to be assumed that there was present for a long time a constantly repeated irritation which would, of course, be attended by more or less inflammation.

Wherever there is an inflammation we have the development of fibroblasts and the formation of connective tissue. This is, of course, nature's method of replacing the tissue destroyed by the injury and eradicating the defect. Ordinarily, the new tissue formed is just sufficient to fill in the defect, but in some cases this fine balance between tissue destruction and the stimulation to connective tissue proliferation is not maintained and we have connective tissue developed far in excess of the requirements of the part. This tendency of excessive cicatrization may be an individual or racial characteristic as in the case of keloid growths to which some individuals of the African races are so prone, but it may be due to the peculiar nature of the irritant, as illustrated by the excess formation of scar tissue in leprosy or by the thick fibrous wall found about an old impacted bullet.

In the connective tissue growths which develop primarily as the result of an inflammation we may have every gradation from that which may be regarded without second thought as redundant cicatricial tissue up to what from its continued and very extensive growth it is difficult to regard other than as a true neoplasm.

The slightly myomatous character of this growth is easily explained upon the grounds of an impaired lymphatic drainage, the lymph vessels having been partially blocked as the result of the injury. Partial stasis of the lymph and an attendant transudation of serum into the interstitial spaces explain the jelly-like consistency of the tissue as seen grossly and also the large amount of homogeneous intercellular substance and the indefinite cell outlines seen in the microscopic sections.

Relation Between Tonsillar Infection and Recurrent Vomiting.

R. TAYLOR, *Minnesota Medicine*, February, 1919.

From a study of forty-seven cases of cyclic or recurrent vomiting at the Mayo Clinic the author is convinced that septic tonsils or enlarged infected adenoids are an important etiological factor. This is borne out by the after history of those cases which had the tonsils and adenoids removed, only one of twenty-four being unimproved. Half of the cases had no attacks after the operation, this period varying from seven months to six years.

Ed.

A SIMPLE, SAFE AND RAPID TONSIL ENUCLEATION TECHNIC FOR LOCAL OR GENERAL ANAESTHESIA.*

DR. LAWRENCE GATEWOOD, New York City.

LOCAL ANAESTHESIA.

When done under local anaesthesia this is induced by the following method:

A solution of $\frac{1}{2}\%$ procaine (novocaine), 4 drachms or 16 cc containing five minims or 0.3 cc of adrenalin 1/1000 or epinine 1/100 is prepared. This should suffice for both tonsils. Through a single puncture located on a line tangent to the crown of the last lower molar and 1 cm. behind it the entire anaesthesia is produced. The needle is introduced, directed backward and slightly outward, with the bevel facing outward so as to produce an early bleb and later to deposit the solution in the peritonsillar tissue. The bleb should be large, covering the entire anterior surface of the anterior pillar. The needle is advanced, as mentioned, infiltrating its course a distance governed by the antero-posterior dimension of the tonsil. The needle is guided by the fascial plane between the capsule of the tonsil and the superior constrictor muscle. Deviation from the correct course may be determined by rotation of the tonsil on its vertical axis when the needle impinges upon the capsule. The infiltration is continued without withdrawing the needle until the posterior pillar has been reached and infiltrated. The procedure is then performed on the opposite side. Usually the left tonsil is first anaesthetized. The patient is then permitted to rest in the recumbent posture for ten minutes. With this method of injection the anaesthesia is complete, the patient experiences no discomfort; he perceives only the pressure of application of the forceps.

Certain types of patients bear adrenalin poorly and require a stronger solution of procain 1%. These are the hyperthyroid cases or those with endocrine disturbances manifested by thick, dark and heavy hair. These patients are best fortified with a preliminary dose of morphine.

THE OPERATION.

Through the loop of the snare the tonsil is grasped with an 8 inch long curved mouse tooth scissor handled forceps, whose blades are about $1\frac{1}{2}$ inches long. As much of the tonsil as can be grasped is included in the bite. The upper blade is fixed first by firm

*Owing to the misplacement of the illustrations in its former publication, this article is re-published from the May issue.—Ed.

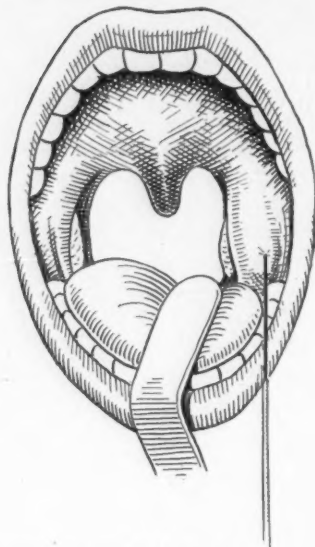


Fig. 1—Bleb formation on anterior pillar.

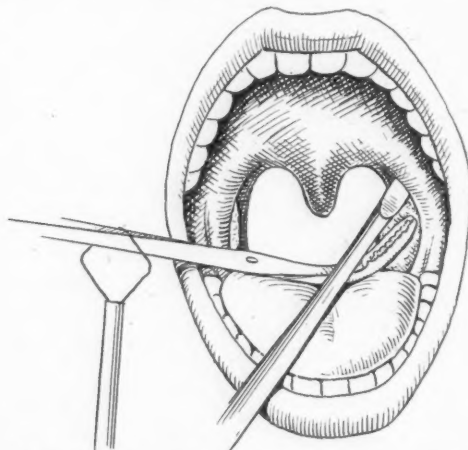


Fig. 2—Insertion of dissector under anterior pillar at point where tonsil is loosely attached.

pressure into the capsule, just below the superior angle of the converging pillars, and the lower jaw of the forceps is then pressed to the same depth, seizing the inferior reflexion of the capsule. The handles are then locked, sufficient pressure being used to pre-

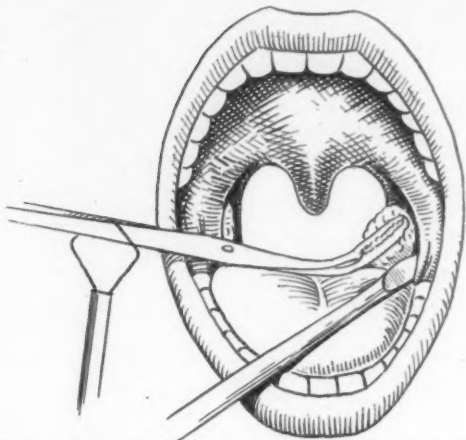


Fig. 3—Position of instrument at end of its excursion in lifting anterior pillar away from tonsil.

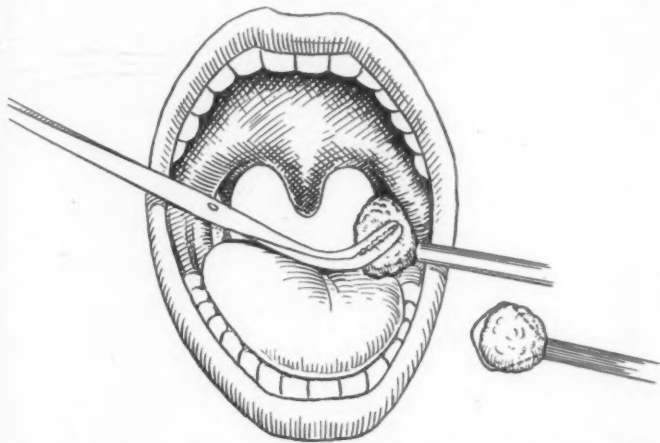


Fig. 4—Anterior pillar detached and tonsil ready for complete separation by means of snare.

vent dislodgment of the blades. If this maneuver is properly performed the capsule will be included in the bite. This is the most difficult step in the operation and its correct performance is essential to the smooth and rapid completion of the enucleation. When the tonsil is buried the blades are introduced in apposition between the pillars and are then separated so as to release the tonsil and the procedure above described is carried out.

The left tonsil is grasped with the forceps in the left hand, the right with the forceps in the right hand. The forceps are then drawn inward and rotated so that the convexity is inferior and serves for the tongue depressor, which is now discarded. A curved tonsil elevator is employed to lift the anterior pillar from the tonsil.

The elevator is introduced with the concavity facing the operator at the upper loose attachment of the pillar by gentle pressure. The mucous surface of the anterior pillar is undisturbed because the tonsil is dislodged from behind the anterior pillar by sliding the anterior pillar and its covering membrane away from the tonsil. The anterior margin of the capsule is now brought into view.

The operation should be quickly completed at this point with a snare shaped to cut from before backward. This is accomplished

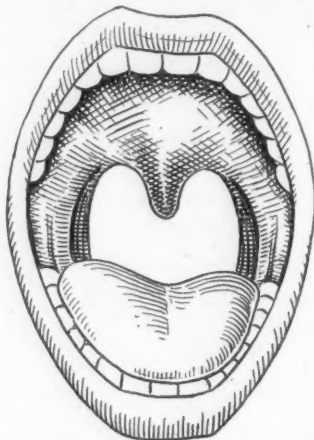


Fig. 5—Appearance of pillars after complete enucleation.

by employing a heavy No. 10 piano wire in an ordinary snare handle bent into a semi-diamond shape.

In entering the snare cannula traction will force the proximal sides of the wire into apposition, separating the tissue between, and then the lateral points of the diamond will have to approach, thus projecting the central portion or the free blunt point of the diamond backward, which becomes fixed at the attachment of the capsule to the posterior pillar, and the mucous membrane is unimpaired because there is no traction on the mucous membrane of the posterior pillar during the dissection of the tonsil with the snare thus arranged. There is no purse string action of the snare which usually tears the membrane away or removes some of the posterior

pillar. Just prior to bringing the stilet of the snare home the handle of the instrument is carried outward, which position favors easier completion of this manipulation. Occasionally considerable force is required in doing this, depending upon the fibrous condition of the tissues. The snare wire arranged this way gives all the advantages of the Sluder instrument, cutting from before backward, besides allowing greater flexibility, thus permitting its insinuation behind the tonsil. Another advantage of this snare is that the connective tissue is bruised and pulled backward over the retracting vessels as they are divided. Occasionally a section of the venule

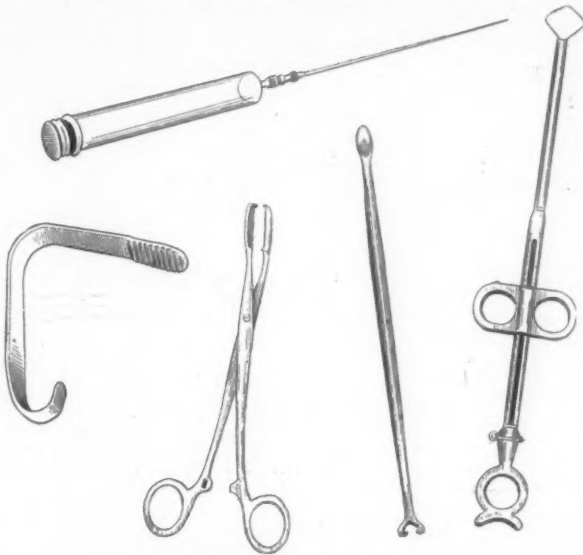


Fig. 6—Instrumentarium.

lying on the capsule is removed. This causes free bleeding, which speedily stops by coagulation in two to five minutes.

It may be remarked parenthetically that thrombophlebitis in this venule is a step in the development of tonsillar sepsis and its prevention an indication for tonsil enucleation. It is important to caution the patient against hawking, which may displace the clots by suction and cause secondary hemorrhage. Should this occur the patient is instructed to lean forward and breathe through the wide open mouth. The hemorrhage will then quickly stop.

The operation should not require a longer time for its performance than one minute per side. The bleeding, if any, from the

side first operated, usually the left, should have ceased before attacking its fellow. The blood loss in the majority of cases is less than eight cubic centimetres.

OPERATION UNDER GENERAL ANAESTHESIA.

When general anesthesia is employed, as for young children, the same technic of enucleation is used. The patient's head is turned to the right and the inferior or right tonsil removed and the fossa filled with a sponge; the left or superior tonsil is then approached. The maneuvers are performed so rapidly that the sponge is not completely saturated when the second tonsil is delivered and its fossa filled with a sponge. Profound anaesthesia is unnecessary and I have frequently performed the operation in an ether rausch.

15 East Forty-eighth Street.

PRACTICAL VALUE OF EAR-STUDIES.

DR. LEWIS FISHER, Major M. C., U. S. A., Philadelphia.

A study of the ear in its relation to aviation is a direct result of physiological and clinical studies conducted by men in this country of that particular portion of the ear which has to do with motion perception and of informing the individual of the relation of his body to objects in space.

A study of the inner ear is important in the field of general medicine inasmuch as it is intimately connected with the central nervous system by numerous nerve-pathways. In this way we are afforded additional means for the analysis and study of many pathologic states, such as vertigo from whatever cause, syphilis of the nervous system, as well as that important branch of neurology—intra-cranial localization. In recent years we have come to realize that the internal ear is not simply an organ of hearing, but that it is an organ with a double function:

- (1) the cochlea devoted to hearing,

(2) The saccule, utricle and three semi-circular canals devoted to the function of sensing motion.

The auditory function has been understood and studied for years. The second function, however, is not so well known and has been studied only in comparatively recent times. To illustrate what this second special sense is it will only be necessary to ask one of the audience to sit in this turning chair and with eyes closed to submit himself to being turned. At the beginning of the turning the direction is correctly interpreted by the subject and he says, "I am going to the right," which is quite true. After being turned several times to the right the chair is now suddenly checked. Immediately the subject says, "I am turning to the left." Here, then, is a man sitting absolutely still in the chair, but receiving the impression of being turned to the left. How does he get this information? All of our impressions are gathered by the special senses and reach the sensorium by fixed and definite pathways leading from their respective end-organs to the higher brain centers. This is true of the sense of touch, taste, smell, sight, muscle-sense, etc. This particular subject feels himself turning to the left. He did not smell it, taste it, or see it (his eyes were closed), and he received it in spite of the fact that his touch and muscle-sense told him the contrary, namely, that he was sitting still. How, then, did he know that he was turning to the left? He knew it by means of the function of the motion-sensing portion of the internal ear. This special function was quite a mystery to the medical profession-until recently. We now realize that this special sense is an addition to our armamentarium and have learned to appreciate its value in medicine.

The examination of special senses generally plays an important role in medical diagnosis. Each special sense consists of a peripheral end-organ, nerve pathways and nerve centers for the reception and interpretation of stimuli. When, on examination of a special sense, there is shown normal function it suggests that the peripheral end-organ, itself, nerve pathways and nerve centers are not affected. Each and every special sense tells its own story, enabling the physician to determine whether the various portions of the central nervous system through which these special senses traverse are or are not free from disease. The realization that the motion sensing portions of the inner ear constitute the beginning of an additional special sense makes it apparent that we are furnished thereby with an additional means of determining the integrity of an extensive portion of the central nervous system—an additional window, as it were, for intra-cranial inspection.

Realizing, then, the desirability of such an examination, the problem is to find a way of conducting it. The method we employ in the examination of this special sense is the same applied in the study of the other special senses, that is, we try to imitate their respective physiology. If, for instance, we wish to examine the taste sense, we put on its end-organ, the tongue, a substance which is physiologically interpreted by the normal individual as bitter, sour or sweet, as the case may be. In the same way, in the examination of the motion sense, we try to imitate under our guidance and direction its physiologic function and see if it accords with the normal. Normally this organ functions by the impingement of flowing lymph upon ciliated hair cells. The inner ear is a cavity, from which project three semi-circular canals at right angles to each other. The entire space is filled with lymph. The semi-circular canals are placed in such planes that no movement of the head or body is possible without affecting the lymph and sensitive end-organs in one or more of these canals. From these end-organs there start nerve pathways distributed to the various portions of the central nervous system.

Let us attempt to analyze the above turning experiment. When the individual was first turned, the lymph in his semi-circular canals lagged behind as the head moved sharply to the right. This can be illustrated by taking a bowl of water with a rose petal floating upon it. When the bowl is suddenly turned to the right the petal remains practically still or moves relatively to the left. The same thing happens in the ear when the head moves sharply to one side. The brain then, by innumerable repetitions, came to associate and interpret lymph movement in the labyrinth to the left as denoting body movement to the right and *vice versa*. When the subject was first turned the lymph, lagging behind and moving relatively to the left, resulted in a brain interpretation of body movement to the right. Therefore, his correct statement, "I am going to the right." When the chair was stopped the lymph continued moving to the right by sheer force of momentum, sending a continuous stream of messages to the brain. This lymph movement to the right was interpreted by the brain as usual as body movement to the left. Hence, the subject says, "I am going to the left." This subjective impression of turning to the left lasted as long as the lymph movement continued to the right.

In the examination of this organ, then, our problem resolves itself into finding a suitable means of setting this labyrinthine lymph in motion. This is usually accomplished in one of two ways, either by turning the individual in a revolving chair, the

method just demonstrated, or by irrigating the ear with either hot or cold water. When the lymph has thus been set in motion experimentally two effects are noted in the normal individual. One, is an eye-movement. The eyes turn in a definite direction. If the lymph is made to move to the right the eyes follow slowly to the right. In a word, they are slowly drawn in the direction of the lymph current. As soon as the eyes have been displaced the brain takes note of this displacement and sends out other impulses to bring the eyes back to the original position. The result is a to-and-fro rhythmic movement of the eyes known as nystagmus. This response is objective, can be watched and measured in seconds.

The other phenomenon of lymph movement is sensing of motion as just demonstrated in the chair. This response, known as vertigo, is naturally subjective, and although it may also be timed in seconds, is preferably measured for clinical purposes by translating it into objective action, namely, past-pointing and falling.

If lymph circulation in the labyrinth produces an eye-movement, there must naturally be a system of nerve-pathways between the ear and the eye muscles. Similarly, if lymph circulation produces a conscious sensation of turning, it definitely indicates the existence of a system of pathways between the ear and the cerebral cortex. It may be briefly pointed out that the pathways for eye-movement and for vertigo are all together within the inner ear and the eighth nerve; that when the eighth nerve enters the brain-stem at the junction of the medulla oblongata and pons, it breaks up into its constituent portions, the eye-movement fibers proceeding to the posterior longitudinal bundles and the vertigo fibers proceeding to the cerebellar vestibular nuclei and then continuing further to terminate chiefly in the temporal lobe of the cerebrum of the opposite side.

It must be taken for granted that normal special-sense mechanisms must produce normal responses. Examination of more than one hundred thousand normals has demonstrated that ear-stimulation invariably produces nystagmus and vertigo. When upon similar stimulation these phenomena do not occur it definitely indicates a pathologic disturbance at some portion of this mechanism. It is not a difficult matter, then, for the otologist, trained to visualize the nerve distribution of the ear, to locate the site of such a pathologic lesion.

A disturbance of the function of a special sense may occur from a lesion or irritation of any portion of the particular special sense mechanism in question. Just as disturbance of sight may result from a lesion at any point of the visual apparatus such as

the eye itself, optic nerve, optic chiasm, occipital lobe, etc., vestibular disturbances may similarly be present from affections at any point of its mechanism, and not necessarily from a local ear disturbance only. Normally the vestibular mechanism serves as a stabilizer for the body, insuring perfect equilibration. Affections of this mechanism interfere with this function and manifest themselves in the various degrees of vertigo. This vertigo, as the patient experiences it, is the same, whether it is produced by a lesion located in the ear itself, or by an intracranial lesion, such as an abscess, thrombus, tumor, etc. It is "vertigo" all the same, and its description cannot throw any light upon its possible origin or the location of the disturbance producing it. A careful otologic examination of the mechanism responsible for it is, therefore, the only possible logical approach to an intelligent diagnosis of its cause.

The examination of the vestibular mechanism is also helpful in syphilis, where it may aid in its early diagnosis, in the detection of early involvement of the central nervous system, and where it may also help as a means of checking up and observing the progress of the disease, and the effects of treatment in cases of definitely established syphilitic disease of the central nervous system.

To the intracranial surgeon and the neurologist, who are so frequently confronted by cases where the symptoms and findings are vague and indefinite, so that the diagnosis of intra-cranial lesion itself is in doubt, or where its location cannot be easily determined, the examination of this mechanism is particularly helpful. Frequently, findings from an examination of this type become the deciding factor in the differentiation between intra-cranial-posterior-fossa lesions and peripheral labyrinthine disturbances. Not infrequently it furnishes evidence of a deciding character in the differentiation between supra and intra-tentorial lesions.

Finally, we must all be cautioned to regard this newer contribution to medical diagnosis in its proper light. It must not be expected to solve all the riddles for the bedside clinician, the syphilologist or the neurologist, but it does furnish an additional approach to many cases of a perplexing nature.

FOREIGN BODY IN THE ESOPHAGUS.

CAPTAIN F. W. WHITE, U. S. A.

The patient was a large, robust man, but of a very highly nervous temperament. Due to this nervous temperament the boys in his company were continually playing tricks upon him, as he stated, "just to see him jump." While sitting by the camp fire one evening the patient related, he took a fifty-cent piece, U. S. money, out of his pocket and placed it in his mouth. Someone noticing this, got behind him and shouted loudly to him and at the same time slapped him violently on the back. This sudden and startling procedure gave him such a fright that he swallowed the coin. He went to the infirmary and later was sent into the hospital.

Upon admission to the hospital he was not complaining of any discomfort, but was highly nervous. The next morning an X-ray picture was made and the coin located. It was lying transversely, at about the level of the supra-sternal notch, and patient felt only a burning sensation and indicated its position by pressing his finger against the front of the sternum. He could swallow fluids without difficulty.

In deference to his desire for a general anesthesia due to his highly nervous condition, he was listed for esophagoscopy under ether. *Captain W.*, chief anesthetist, asked as a favor that rectal anesthesia be administered, but due to the short space of time to prepare the patient it was not at all efficacious and had to be supplemented by a small amount of ether by the drop method and a few drops of a 20 per cent solution of cocaine to the pharynx.

The esophagoscope was introduced and at a distance of eleven inches from the upper incisor tooth, a short distance below that shown in the picture, the coin was easily located and quickly removed. No untoward effects ensued. Patient was sent to duty.

NOTICE.

The next meeting of the Colorado Congress of Ophthalmology and Oto-Laryngology will be held in Denver, Aug. 4 and 5, 1919. Dr. Harry L. Baum, Secty., Metropolitan Bldg., Denver.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOTOLOGY.

March 14, 1919.

Interesting Symptoms in Connection With a Case of Brain Abscess.
Operation and Recovery. DR. WESLEY BOWERS.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. LEDERMAN asked if the eyegrounds of the soldier were examined.

DR. BOWERS replied in the negative, as the case was seen out in the country and it was impracticable. The pulse was at 90 most of the time.

DR. LEDERMAN said that Dr. Bowers was to be congratulated on the result with such an abscess, the size of it and the amount of pus evacuated. The abscess must have been encapsulated, or the manoeuvring of the patient would have caused trouble. He then cited the case of a man with a mastoid operation who seemed to be doing very well when suddenly symptoms of brain involvement appeared; he developed a nystagmus, slow pulse, and a cerebellar abscess was suspected. Instead of doing an operation directly over the cerebellum, the line of probable infection was followed (from the posterior aspect of the mastoid wound). The bone was very thick, and it took quite a time to get through with the bone forceps. The chisel was not used to avoid the concussion. A cerebellar abscess was found and drained. The patient, however, died. In that case the infection had been there for some time and was completely encapsulated. Such cases show few focal symptoms.

DR. KERRISON said that in the majority of fatal cases of brain abscess the immediate cause of death was not the abscess itself but the resulting meningitis. The course of the lesion usually follows either one or the other of two directions, (a) gradual development of meningitis with characteristic symptoms; or (b) rupture of the abscess into one of the ventricles or into the subarachnoid space, with rapidly fatal termination through suppurative meningitis.

Analysis of cases successfully operated on show that the best results are obtained by simply opening the abscess and keeping the pathway of escape open, with abstinence from all unnecessary manipulation.

DR. LESHURE asked if Dr. Bowers had had any experience in incising the dura and then waiting for a day or two. It is claimed that in some cases it has had an influence in preventing meningitis.

DR. BOWERS replied that he had seen that done, but did not know the value of the procedure. Some claimed that the abscess might point by gravity at that place, and make it easier.

DR. LESHURE said a general surgeon had recommended the procedure: he made a crucial incision, and claimed that the support of the dura being removed, the pus naturally pointed toward the exposed area.

A Case of Cerebellar Abscess and Sinus Thrombosis. DR. PHILIP D. KERRISON.

(To appear in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. BOWERS asked why Dr. Kerrison had not opened the sinus at the time of the operation.

DR. KERRISON replied that at this time there were no symptoms to indicate the intra-sinus infection. The patient was admitted to the hospital for a plastic operation which was abandoned because the patient took the anaesthetic so badly. A few days later a large quantity of pus was evacuated from an abscess behind the right tonsil and it was assumed that

this was the cause of his symptoms. He died five days later. Owing to the condition of his throat any extensive operation between the time of his admission to the hospital and his death would have been impossible for the reason that he could not have survived the anaesthetic.

DR. LEDERMAN spoke of the value of symptoms as suggesting streptococcal infection, especially in the throat lesions, and said that he had seen a number of cases with rapid onset of oedema and very serious symptoms following streptococcal infections. Why might not there be some lymphatic involvement? These cases were very serious from the start. In Dr. Kerrison's case there was no clinical indication of sinus involvement; he had not mentioned any chills, etc. In a number of instances where abscess of the sinus had been found, it was the atypical symptoms that had been described. If a positive blood culture is obtained, the indications were clear, but he had operated on cases where the blood culture was negative and yet the sinus was involved.

DR. GUTTMAN said that the inflammation of the throat might have produced a bacteremia without any sinus involvement at all, the bacteremia alone did not necessarily mean an affection of the lateral sinus.

DR. J. MORRIS SMITH said that Dr. Kerrison had mentioned a retro-pharyngeal abscess. That had especially interested him, as he had had a case of streptococcus capsulatus in which he had performed a simple mastoid operation. It was apparently running a normal course, and the patient came to the clinic for dressings. Instead of healing, however, as it should have done, the wound continued to discharge. He was asked to look at it a month after the operation; the discharge was more than it should have been and he dressed it, but instead of improving it began to get more profuse. The patient then complained of stiffness of the neck, and had a temperature of 102. The throat was examined, and a beginning bulging was observed in the retro-pharyngeal space. The mastoid cavity was filled with pus. The patient was readmitted to the hospital, and an incision was made and the pus welled out from the retro-pharyngeal abscess. The smear showed a capsulatus infection. Twenty-four hours later the mastoid wound was practically dry. There certainly seemed to have been some connection between the two conditions. Dr. Smith said that after treating the patient for four or five days he was called out of town and the man left the hospital and disappeared from observation. It was an interesting problem as to how the pus got through. Had Dr. Kerrison seen any similar cases?

DR. LESHURE said that this was the third case that he had heard of within a few days, a complication of retro-pharyngeal abscess with a mastoid. It was an interesting subject for discussion, and he hoped that Dr. Kerrison would be able to explain the connection between the two conditions.

DR. KERRISON said he was unable to say anything as to the connection between the two lesions. That a peritonsillar abscess might give rise to an infective sinus phlebitis was theoretically possible but not easy to establish in any given case. On the other hand, the development of a peritonsillar abscess as a metastatic process from a sinus thrombosis obviously might occur. Dr. Kerrison said that in the case operated by him the clot in the sinus had every appearance of being of very recent development.

Two Cases of Fractured Skull, With Secondary Mastoiditis, Meningitis, and in One Case, Brain Abscess. DR. J. M. SMITH.

(To appear in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. CARTER said that he was especially interested in the first case reported by Dr. Smith, as it brought to mind a case he himself had presented before the Section in 1917. The patient was a robust truckman, 43 years of age, who had been knocked down by a street car and carried into Gouverneur Hospital in an unconscious condition, bleeding profusely from the right ear. The haemorrhage continued for five days

before he was asked by Dr. Erdmann to see the patient, as he had been admitted to the general surgical division. Dr. Carter said that the x-ray plates showed a linear fracture extending from the temporal region to the mastoid, he had suggested the application of ice bags. Twenty-four hours later the haemorrhage had ceased, and the patient was more comfortable. He became conscious the third day after admission, and got along fairly well for two weeks. At times there was mental aberration. About this time he was suddenly seized with an intense pain in the right ear extending into the neck and along the sterno-mastoid. Examination showed a tonic contraction of the sterno-cleido mastoid and on palpation excessive tenderness over the mastoid and on the right side of the neck. The patient was almost screaming with pain and was begging for relief. A mastoid operation was performed, and all the cells, which were numerous and large, were found to be filled with blood clots, and in the antrum there appeared to be a sort of sanious pus. A culture showed streptococcus infection. The sinus was uncovered, and was found to be almost black. It was incised, there was no haemorrhage; a clot three inches long and reaching to the torcular was removed followed by four haemorrhages; another clot was removed from the direction of the bulb. Then the vein in the neck was exposed; there was no clot below the entrance of the facial vein. The vein was tied off, but the vessel wall was not excised. The man slowly recovered, but suffered from a sort of mental aberration. At one time it was thought he might have meningitis, and a puncture was made, but the spinal fluid was negative. He seemed to be getting along fairly well, but about two weeks after the operation mastoiditis developed on the left side, which was operated upon. Following the operation he had erysipelas which cleared up in a week or ten days. His recovery was slow, and when presented before the Section was brought to the academy in an ambulance, but eventually he got entirely well.

In that he had a fractured skull and afterwards developed mastoiditis the case was very similar to that of Dr. Smith's. The severity of the haemorrhage from the ear was a surprising and unusual feature. It would be interesting to know what vessel could have produced such bleeding from the ear, extending over a period of five days. The temperature of this patient was very much higher than in Dr. Smith's case, being 105 at the time of operation, and later 106, and subsiding by lysis.

DR. LEDERMAN asked if there was any history of ear disease before the accident.

DR. SMITH replied in the negative. The man sustained an injury and had a secondary infection, developing an otitis, mastoiditis, and meningitis.

DR. LESHURE asked if any injury to the dura was observed. Dr. Smith replied that there was none. Dr. Carter's case was a very interesting one. In the case just reported, the bleeding probably came from the fracture. Dr. Smith said he did not think any particular vessel was injured, but in Dr. Carter's case it would seem that the lateral sinus had been injured, which would have accounted for the profuse haemorrhage and the sinus thrombosis following, for an ordinary vessel would hardly have produced such profuse and continuous haemorrhage.

The two cases he had reported had especially interested him for he had seen nothing like them before, and the question as to what should be done was a difficult one. He was inclined to think that if confronted with a similar case in future, he would simply remove the cortex and take a chance of its localizing itself.

DR. LEDERMAN quoted Dr. McCuen, who in one of the meetings of the International Otological Congress said that in operating on brain structures he does not try to clear away all the tissue, but allows nature's barrier (granulation tissue) to remain; since in many cases where he did less they got well, whereas in others where the wound was thoroughly cleaned, the patients died from extension of the infection. It is very important to leave well enough alone, especially in cases of this character where denuded surface is exposed to reinfection.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

*March 26, 1919.***Glosso-Labio-Laryngeal Paralysis. DR. H. ARROWSMITH.**

This patient, a man 54 years of age, married, a carpenter, gives no family or antecedent personal history which has any bearing on his present illness. A Wassermann test was negative. He has hitherto been in vigorous health.

Early in the summer of 1918 he first noticed a trifling indistinctness of speech and a slight difficulty in the first stage of swallowing. These symptoms have become progressively more accentuated up to the present date. He now speaks almost unintelligibly and when he attempts to swallow, the alimentary bolus is quite as likely to be expelled from the mouth as to reach the stomach. Once fairly in the esophagus, its course is unimpeded. He cannot control his lip muscles sufficiently to produce a whistle. The various movements of the tongue are slowly and very uncertainly performed.

I have been unable to secure a very satisfactory view of the larynx by either direct or indirect inspection.

Glosso-labio-laryngeal paralysis has no known cause, beyond the assumption that it may be due to an intoxication of some sort. Its course is steadily progressive to an inevitable fatal termination. Treatment of any kind is of no avail.

Atrophy and degeneration of the motor nuclei and nerves of the medulla and pons occur. The nerves involved are the hypoglossal, pneumogastric, facial, glossopharyngeal, spinal accessory and motor trigeminal.

This is the third time that I have encountered this disease. All the patients were males and beyond middle life.

DISCUSSION.

DR. FREUDENTHAL told of a similar case seen some ten or fifteen years ago. The patient was a physician, an exceptionally intelligent man who had been president of the State Society in a neighboring state. He had had some trouble with his larynx and had consulted physicians in Boston, who removed his tonsils, but naturally there was no improvement. About that time Dr. Freudenthal had published a paper on rheumatism of the larynx, and this physician read it and consulted him, believing that he suffered from this disease. The patient's speech was halting, and examination revealed the same condition presented by Dr. Arrowsmith's patient. The faradic and galvanic current were applied for a while and he felt a little better subjectively.

Unfortunately, however, the case was mentioned in a discussion at a medical meeting (though of course no name was mentioned) and it was reported in a medical journal. When this physician read it he was very much affected and collapsed. He discontinued the treatment, went home, and died an awful death. The paralysis extended and affected the oesophagus upper and lower extremities, etc., and he died not by inches but millimetres.

In Dr. Arrowsmith's patient there was a partial paralysis of the soft palate so that it moved very little, and the epiglottis did not move. There also seemed to be other parts partly paralyzed, as the patient could not pronounce the dental sounds very well.

Dr. Freudenthal said that he had also seen another case, strange to say, the wife of a physician, who developed the same condition. She had been treated for neurasthenia.

DR. ARROWSMITH said this was the third case he had seen. The first eventually developed a bilateral abductor paralysis. His family declined to have a tracheotomy done, and in about two weeks he died of asphyxiation. The other patient died a most horrible death, as Dr. Freudenthal said, almost by millimetres.

Two Cases of Subglottic Tumors. DR. W. FREUDENTHAL.

The first patient was about 63 years of age, and was referred by a Chicago laryngologist. Examination revealed a very clear picture. There was a mass at the anterior commissure affecting the left vocal cord and

the parts below the cord. He stated that he had had trouble with his throat for many years but that the hoarseness had become worse within the last six or eight weeks. There was no pain; two Wassermann reactions were negative and there were no signs of any specific conditions. Clinically it was a plain case of malignant neoplasm. Tracheotomy was advised, to be followed within a week or so by hemi-laryngectomy or whatever might be indicated, and afterwards the application of radium. The man returned to Chicago, and was seen again about five months later, where then was absolutely no change from the first picture. He stated now that he had called on a third laryngologist in Chicago for the past three years, who told him that the neoplasm was stationary. Under the circumstances it seemed best to defer operation. It would seem that in this case the growth was of a comparatively benign nature, like certain forms of scirrhous mammae. Dr. Freudenthal said he had seen such cases go on for ten or twenty years, doing fairly well. This patient feels perfectly well otherwise, eats and drinks, and attends to his business, and will be content if he can live ten or fifteen years more. He has been told that a tracheotomy may be necessary at any time.

General surgeons are usually very ready to operate on such cases, but laryngologists are more inclined to wait in certain cases. In one instance a retired merchant, 70 years of age, with a little ulceration on top of an apparently malignant neoplasm in the larynx, had been treated by the speaker for several weeks with orthoform, and was doing fairly well. Finally he complained that he was not getting any better and consulted a general surgeon, who operated. In twenty-four hours the patient was dead. In such a case no one had a right to operate. In another instance a patient 78 years of age had a neoplasm on one side extending over to the oesophagus, forming quite a large mass. No major operation should be done on such a patient, unless a tracheotomy has to be performed. A surgeon, however, operated on this case also, and in a short time patient died. We often read that Doctor so and so operated on such and such a case and in three or four weeks the patient left the hospital cured, but no one has ever seen a case of cancer cured in that time.

In the present case I now advised applying radium intra-laryngeally. That means a great deal of work, as the radium cannot be left in place for more than about 20 minutes or a half an hour at a time. Dr. Botey, one of the best laryngologists in Spain, a man of large experience and very reliable, recommends applying radium intra-laryngeally by means of an intubation tube, which is a very clever idea. He applies the radium through a little pocket on one side of the tube, and has devised a special forceps for the introduction of the tube. He thus left the radium tube in for from 24 to 48 hours in some cases, but concluded that this was entirely too long; there may be a very severe reaction, with a serious oedema. He does a tracheotomy before putting in the radium, wherever the slightest stenosis is present.

Dr. Freudenthal said that Dr. Arrowsmith had seen this case and agreed with the diagnosis.

The second case was a man 41 years of age, apparently in good health, who stated that for six years his voice had been quite hoarse. A large mass found under the right cord at the anterior commissure, affecting the subglottic region, undoubtedly a benign tumor. It would probably not be difficult to remove this mass by the indirect method or under suspension laryngoscopy, but that would seem to be a dubious procedure in a case of this kind, as one could not be certain of removing everything, and the growth might recur soon. Some years ago there was a great deal of discussion about the possibility of the transformation of a benign into a malignant tumor, in connection with the case of the Emperor Frederick. Lennox Browne was very emphatic on the subject, and several of the men here favored it, but Dr. Freudenthal had not seen any such transformation. If such a mass is removed incompletely, relapses may occur frequently and then malignancy is apt to set in.

By doing a simple laryngotomy every affected part could be seen and removed. The operation is very simple and there is no danger attending it.

DISCUSSION.

DR. ARROWSMITH said that Dr. Freudenthal's first patient came over to see him and stated that he had come for a diagnosis of his laryngeal condition. Examination showed an absolutely typical laryngeal epithelioma; the man asked his advice as to what should be done and was told that if it were his own case he would feel much better if the growth were removed. Then the patient related the history which Dr. Freudenthal gave. The first information that he had that anything was amiss was after Dr. Freudenthal had written to his attending physician in Chicago, who told him that he had recognized the condition before and there had been absolutely no change in it; and that Dr. Freudenthal on his second examination agreed in that diagnosis. That altered the situation. The man had a good voice and under the circumstances it seemed best to leave the tumor alone.

Dr. Arrowsmith said he had seen several of these tumors. One patient had a growth of the larynx which was pronounced by a competent histologist to be positively malignant. The man refused operation and ten years later was alive and well with practically no increase in the tumor or symptoms. Sometimes these things go on for years without any tendency to spread or metastasis, but unless such patients can be kept under competent observation it is dangerous to allow them to do without radical operation.

DR. HARRIS said that the condition spoken of by Dr. Arrowsmith and Dr. Freudenthal was described by Professor Moure as one of benign malignancy. He had seen a number of these cases and many of them went on for years without any change in the picture. However, he gave the ultimate history of several, and stated that all of a sudden, after years of indolence, they developed a very malignant character, and in a few weeks the condition was entirely beyond operation. It is a well known fact that often these conditions remain non-malignant for a very long time.

Limitation of the Diagnostics Value of the Skiagram in Diseases of the Nose and Ear. DR. JOHN GUTTMAN.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. FREUDENTHAL said that Roentgen ray pictures are of great importance in this work, and as a rule no laryngologist should operate without them. On the other hand, we must know who takes the pictures, for there is a very great difference in their value. Some are so poor that one cannot recognize anything at all. On the whole, though, the pictures are much better than they were some years ago. Secondly, no one should operate on a cloudy finding unless it is confirmed by clinical findings; the fact that is of most importance is that we get pus directly from the cavity. Only in rare instances should there be any deviation from this rule. Dr. Guttman said that in one instance the mucous membrane was white and the nose was normal; how could that be?

DR. CARTER agreed with Dr. Freudenthal, and emphasized the fact that radiograms should be depended upon only as corroborative evidence of sinus disease. On more than one occasion he had opened a sinus that according to the x-ray picture was decidedly diseased but was found to be normal; yet these radiograms were taken by one who is considered to be one of the best men in the city. It is his rule now to follow the clinical evidence rather than that presented by the x-ray plate.

DR. HAYS said that the remarks by the previous speakers brought to mind a paper read by Dr. Dixon and himself some five years ago. Dr. Dixon takes as good pictures of the mastoid as anyone, and yet in that paper he claimed that while the x-ray evidence was of unquestionable

value, it should always be considered in connection with the clinical findings. Personally, Dr. Hays said, he had always been inclined to operate when a mastoid showed clinical symptoms, and these symptoms were corroborated by the x-ray findings, but a case seen recently had rather discredited that view. The patient was a woman with distinct symptoms of mastoiditis, what might be called a latent mastoiditis, with no temperature and no particular pain; but a sagging of the posterior wall, etc. She did not appear sick, but the x-ray picture showed cloudiness and he advised operation. She then consulted Dr. Whiting, who could not make up his mind on the subject, and she decided to wait. That was three weeks ago and the woman had apparently recovered entirely. Dr. Dixon thinks that in some cases where there is good drainage from the middle ear nature will clear up these threatening conditions. In such circumstances there is not much danger in waiting, and many of these cases do recover, for the time being, without operation. Coming to the nasal cases, in many instances, even where transillumination has showed shadows and this evidence was corroborated by x-ray findings, operation has failed to show the amount of pus expected. It is difficult to understand such findings, but no one should take x-ray evidence alone as justifying operation; considered in connection with the clinical findings, it is worth a great deal.

DR. GUTTMAN said he had stated in the paper that the mucous membrane of the antrum—not of the nose—was white. Sometimes the antrum is opened in the expectation of finding a large amount of pus, and nothing is found but a white glistening mucous membrane. Dr. Hays' remarks were very much to the point. It seems certain that in almost every case of acute mastoiditis one will find involvement of the mastoid bone at the same time with an infection of the middle ear.

Meeting of April 23, 1919.

DR. E. V. HUBBARD, Chairman.

Plastic Surgery of the Head in War and the Medical Question in Czecho-Slovakia. LT. COL. J. C. BECK.

Dr. Emil Mayer of New York, in presenting Lieutenant Colonel Beck said that he had assumed the responsibility of arranging for the address of the evening, and wished to take this occasion to thank the officers of the Section for the generous co-operation.

It was not necessary to introduce Dr. Beck to any audience of laryngologists in this country, though few of us knew him as Lieutenant Colonel Beck, not as has been stated of the U. S. Army, but of the Czecho-Slovak Army.

Dr. Beck is going to relate some of the things he saw and did in plastic surgery among the wounded soldiers, and he particularly requested Dr. Mayer to ask for the consideration of his hearers in that his time for preparation had been far too short, as the title of the subject had only been given him on his arrival at Halifax two days previously. So that any shortcomings must be laid to that fact.

As to the second part of the subject, it is one of which we are very likely to hear much in the near future, for there must be reconstruction in medicine as well as in all other branches of life. We have been plodding along doing the same things today that we have done hundreds of years ago, and it is only now that we are hemmed in on all sides by enormously increased demands upon us, we are beginning to see that we must meet them.

In the same manner there has been no opportunity for the student to learn where he might go and receive the best instruction when he went abroad, and it seemed to the speaker that some plan such as Colonel Beck would outline would become a vital necessity.

Finally, as our good friend Colonel Beck has only just arrived from the other side, the speaker extended to him a most cordial and hearty welcome home.

Lt. Col. Beck: Dr. Mayer has made my apologies to you as well, and that is the reason I asked him to, because I knew he could do it so much better than I; but the fact is that I did not know anything about this lecture until I came off the ship two days ago, when the letter was handed to me. Of course I am prepared to talk about the subject, for it is that which I have been doing during the present war, but you will have to pardon me if I talk at random, and pick out what I think are the important points. I cannot go into the subject in detail tonight. My talk will consist of a description of plastic surgery of the face, head and neck which I have observed, rather than what I have personally done during this war. In the beginning, as you know, I had the honor to instruct some of the men who were to do this plastic surgery work in France. I gave some instruction in St. Louis and in Chicago, and I had the great pleasure of seeing some of these men doing good work in France. However, they were not all fortunate enough to get the opportunity of doing plastic surgery. I had given them instruction on the cadaver after I had selected the operations which I thought would be most useful for them. I divided the operative work into immediate plastic surgery and subsequent or later plastic surgery, which was more for cosmetic purposes. I laid great stress on plastic surgery principles such as we had learned before the war—principles which were never, under any circumstances, to be deviated from, as for instance: Never make any flap longer than three inches; never use tension; do not suture closely, and do not draw sutures very tight. Do use warmth and protection over those parts which have been corrected and finally, the patient's general and local condition must be fit for the operation. I drilled the men constantly on these points. I taught them one operation which I thought they would use a great deal, the use of the finger or other Italian methods for reconstruction of the nose. When I got abroad I was surprised to find that only one or perhaps two of these important principles were being adhered to. That is to say, I found out that they were not true. I found out that the only thing which was important was the tension proposition. It was strictly adhered to that no tension should ever be exerted on plastic flaps. I also mentioned in my course of instruction that the Wolfe grafts were practically useless. I found that that was a mistake because many good results were obtained from the use of them. In my experience over there in the American Red Cross Hospital No. 113 I had about 83 cases in all of plastic surgery, conditions such as these: various degrees of loss of the calvarium and skull; partial or total loss of external ear; partial or total loss of nose; loss of nose and upper jaw, including a loss, partial or total, of the upper lip; loss of one or both eyelids, and in many cases the loss of one or both eyes. Of course, in this latter case plastic surgery was not considered from the cosmetic or functional point of view. The loss of a part or all of the upper jaw, with or without the loss of the lip, facial paralysis, hypoglossal paralysis, neck wounds with perforation of larynx, trachea, and esophagus.

A description of many of these cases would no doubt be of interest, but I shall not have the time to do it tonight. The results on these cases, up to the time that I was relieved of my service abroad, were about as good as the average. My observation of the plastic work of others was much more interesting and much more valuable to me. I had the pleasure of observing plastic cases in the following places: Paris, Lyon, Dijon, Bordeaux, Prague, Pardubitz, Rome and London. Some of the men were Sibalo, Morastin, Moore, La Maitre, Morax, Jedlicka, Patravalsky, Kukula, Durante, Alexandro, Ferreri, Cole, Gillon and Risdon.

It is needless to say that there were many cases under observation and constantly being operated upon. At first when the work was very pressing, only the most necessary cases were operated on, and not very well performed, but later the cases were more carefully selected and better planned. Let me state again, that of the five principle points which I had insisted on during my instruction, only two of them was any

attention paid, namely, the absolute necessity of loose tissue and a good general and local condition of the patient. The length of the flap and the warmth and protection were dispensed with. The recommendation of the Italian procedure and the disapproval of the Wolfe graft I have told you were also wrong, because only in a few cases were they able to employ the Italian method, as the men would not submit to it. They would not submit to having their arm bandaged and put in a plaster cast. I was a little crestfallen because I had advocated that operation so strongly, and then found it was not used. In Italy it was employed in a few cases.

There are a few things in this plastic work that I wish to emphasize particularly. Both in France and in England the dental mechanic was indispensable to this work. Contrary to this was the work in Prague and in Italy, where they did not pay much attention to the dental men. Many of the assistants have developed great skill in this plastic work due to their enormous experience, so that often the assistant appeared to do better work than the master. This was particularly noticeable in Paris. In comparing the results, I should say that England showed the best results, and particularly the British Division. In the Queen's Hospital at Sidcup, there were a great many good cases. All the four sections, British, Canadian, New Zealand and Australian, followed the same principles. The Hindoo flaps were used for reconstruction. The utilization of cartilage and rib was very much employed by the English. In fact, it was almost comical at times to see them take out a good portion of the cartilages; some men take the entire thickness, some leave a strip, plant them under the skin and then use them for a number of other cases, so that they do not have to do this rib operation over again in the next case. In reference to the Wolfe-Tiersch graft they are employed constantly in England, especially for the prevention of scar formation in the mouth. I saw some very fine results in Sidcup from the use of the Tiersch graft in the reconstruction of the lower jaw; they were placing these skin grafts inside to prevent the tissues from shrinking. For the reconstruction of the lower jaw, large flaps from the neck, back and chest were used by all and with very good results. The French made use of the double pedicle flap, that is, in making a flap from the neck they leave it attached on either side of the neck. The English make two and form them into a sort of tube in order to prevent their infection, and giving better nourishment to their flaps. As I said, they form a flap and then double it up so as to form a sort of tube. La Maitre, the French expert, is to my mind the most clever of them all. His mechanical devices are of a special sort for each case and are employed more for physiological than for cosmetic reasons. His system of handling and recording cases is the best I have ever seen. In regard to the osteoplastic work, especially referable to the lower jaw, the two nations, England and France, differ entirely. The French make a great deal of fuss about the saving of all periosteum possible, for they base their reasoning on the reconstruction of the jaw on these fragments of periosteum and depend on them entirely. The English are not particular about preserving the periosteum; in fact, they rather do away with it. Their latest is the use of the crest of the illeum for the lower jaw, and one reason why they gave up the tibia was because they reported fractures of the leg after the removal of the bone from the tibia for reconstruction of the jaw. This covers about what I wanted to tell you about the plastic surgery.

As I said, every one of the cases that came under my personal observation were very interesting. They were not many, because I did not have charge of this special work; I was rather engaged in consultation and making social calls on patients (Czecho-Slovaks) in different hospitals, training nurses, etc., for it was not possible to get them from the Red Cross, so that my duties were more executive in nature than actual work. I expect to do the subject of my experience justice by the publication with illustrations, which I hope will not be so disjointed as my talk this evening.

What I particularly wanted to speak to you about tonight was the second part of the subject on this program. This is what my mission from the Czecho-Slovak government to the United States is concerned with. They sent me on this mission to tell the physicians of the United States what they have to offer in the way of education for American doctors in post-graduate or clinical work. When I was in Prague I was much impressed with the way the hospitals were taking care of the doctors and what they were doing in this particular field of educational reconstruction in order to take the place of the old clinics in Vienna and Berlin. The education there (Prague) will not at least for some time to come develop very much unless something is done. I therefore proposed a scheme which I call the "Inter-allied University Clinic for the Development of Specialists." The clinic is to be a system of education somewhat on the university basis, in the allied countries that are now recognized, that is, the United States, France, England, Italy and Czecho-Slovakia. I proceeded at first to organize such a clinic in Prague and met with the greatest encouragement everywhere, so that a very nice provisional program was made out. I next went to Rome with that program, to the Policlinico, met the clinical faculty and organized in the same manner as in Prague. They were very happy because they had never had many American doctors visit them, and they did not know what to do in order to encourage Americans or foreigners to come to their clinics. They had very good material, although their methods differ from ours considerably, but everything I saw there was very interesting. From Rome I proceeded to Paris, where I had done a little work along this line before leaving for Bohemia and now I found that work had already begun in Paris, although it was under the military regulation. Colonel Lloyd, of the Post-Graduate School of New York, was very active in the University of Sorbonne, having overcome a great deal of opposition, which I had had to overcome also both in Prague and in Rome. They were giving courses to medical officers at the Sorbonne. Of course that is a forerunner of what is to be—a clinic in Paris for Americans and others in the future. It was a splendid program and Col. Lloyd was happy that I had been working on this same proposition and that I was ready to co-operate with him. I hope that this may materialize in the future. I must also state that at the same time Captain Francis of Buffalo had arranged a course with Le Maître of the Brazilian Hospital on plastic surgery for a class of American officers. On leaving Paris I went to London, and to my great astonishment, as I had not heard that anything was going on in London along this line, I found that London was way ahead of Paris or any place else that I had visited. They were ready for work. On calling on Sir Lane he told me that they had started it and Dr. Franklin, an American, who had been practicing in London for twenty years, had organized a very efficient school. Sir William Osler, with whom I had the pleasure of talking over the whole scheme, had got all the hospitals in London together in order to make this a large educational proposition. Dr. Franklin is to manage the American Medical Institution, a very high-class affair, possibly under the American Medical Association. In other words, it was thought that London should be the centre of this scheme, and Dr. Franklin, who is a very capable man, to be in charge of the organization. When a man comes abroad he will go to London and get his bearings from there. He will be given information as to just what he can do abroad in the way of his own specialty. The schools and clinics are anxious to have these visitors and they will be organized so that the men can get the most out of their work. Of course the idea was to have it more or less on a university basis; thus it would be stripped of commercialism and everything would be done to make it efficient. Men would go over for the most part to study and to do special work, and not go over for the three or six months' course which we all remember were given in such places as the clinics of Vienna and Berlin. Another point which I want to bring in is that men who do not go over to take special work, who are well qualified already and want practice, will be able to get this work, without standing

around waiting for an introduction. We are trying to arrange this so that there will be a mutual understanding between specialists abroad and at home.

Finally I want to say that I am most concerned in the organization of post-graduate teaching in this country. There is absolutely no reason in the world why we should not have the best institution for the development of specialists in America, and all we need is the co-operation of the universities. I know there is a movement on foot to bring this about and I hope that during my absence abroad much has been accomplished.

Dr. Emil Mayer, in closing the meeting, said that there was no necessity for anyone to ask questions, because Dr. Beck had covered his ground so well. From what he has said it would seem that it is up to us to get together and make our institutions stand for something in return for what we shall learn from abroad. One thing that all of us know who have done much visiting of clinics is that the chiefs of clinics are usually very willing to show what they are doing. It is the one thing that we must learn to do in America. Dr. Mayer recalled how the late Dr. Asch always used to leave instructions that when a physician sent in his card he was to receive every courtesy, and he got it. Dr. Mayer hoped that we can make some practical use of these suggestions of Dr. Beck's, as he feels it will redound greatly to our credit.

Plethysmographic Study of Shock and Stammering. S. D. ROBBINS, *American Jour. Physiology*, April, 1919.

Robbins found that shock and stammering are accompanied in every case by marked vasoconstriction. Those subjects who experience the greatest vasoconstriction during shock and stammering also require the longest time for recovery. Stammerers as a class experience slightly greater vasoconstriction in shock than in stammering. Those subjects in whom the fear of stammering is pronounced experience greater vasoconstriction and slower recovery in stammering than in shock. Vasoconstriction continues throughout the stammering interval; vasodilatation accompanies normal speech in the majority of cases. Robbins concludes that stammering and shock are induced emotional disturbances accompanied by the same vaso-motor changes—confirming Bluemel's theory that stammering is caused by transient auditory amnesia in the auditory speech center brought on by cerebral congestion. Ed.

